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Fishing Life in the Bangweulu Swamps: A Socio-ecological Study of the Swamp Fishermen in Zambia

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ABSTRACT The swamp fishermen enter into the Bangweulu swamps from their main village out of the swamps in the dry season when the water level decreases. They aim at selling their catch to the markets in Copperbelt cities. In this paper, fishing methods used by them are described, and the catch by each method are analysed. The swamp fishermen carry their fishing not only in the daytime, but also engage in night fishing, by which they can get nocturnal fishes effectively. They form the production units called *nsanga* mainly throgh their affinity for fishing and selling their catch. The fishing methods selected by them differ from *nsanga* to *nsanga* in a fishing camp, accordingly, the fishing period, time and caught species also vary. Such utilization of the swamps can be regarded as a segregation among the swamp fishermen.

INTRODUCTION

Although the Republic of Zambia is a landlocked country, it is well provided with large lakes, rivers and swamps, such as Lake Tanganyika, Lake Kariba, Chambeshi River, Kafue River and Lukanga Swamps, in which have a lot of numbers of fish.

Fishes provided from the inland waters occupy an important part as the animal food for the people, and inland water fishing has been carried out for a long time. Fresh water fish can be regarded as one of the important natural resources in this country. The locations of major fisheries of Zambia are as follows (Fishery Statistics 1977, Fig. 1, 2) :

(1) Bangweulu Area
(2) Mweru-Wa-Ntipa
(3) Lake Mweru
(4) Luapula River
(5) Lake Tanganyika
(6) Lukanga Swamp
(7) Kafue River
(8) Lake Kariba

These fisheries provide fish for consuming public of the cities in Copperbelt Province and the capital city Lusaka, and a number of researchers or officers of administrative machinery have engaged in the study of fish or inland water fishing industry.

Most of the studies have been concentrated upon the ecology and morphology of fresh water fish which inhabit Lake Kariba or Kafue River. Few studies about fishing methods, analysis of catch and the life of fishermen of inland water fishing have been carried out until now. Only one report by Everett (1974) can be found, in which the commercial landings of fish in three areas of the Kafue Floodplain are examined in regard to fishing technique used, catch per unit, effort and species composition.

According to Fisheries Statistics (1977), catches recorded in Bangweulu Area in 1971

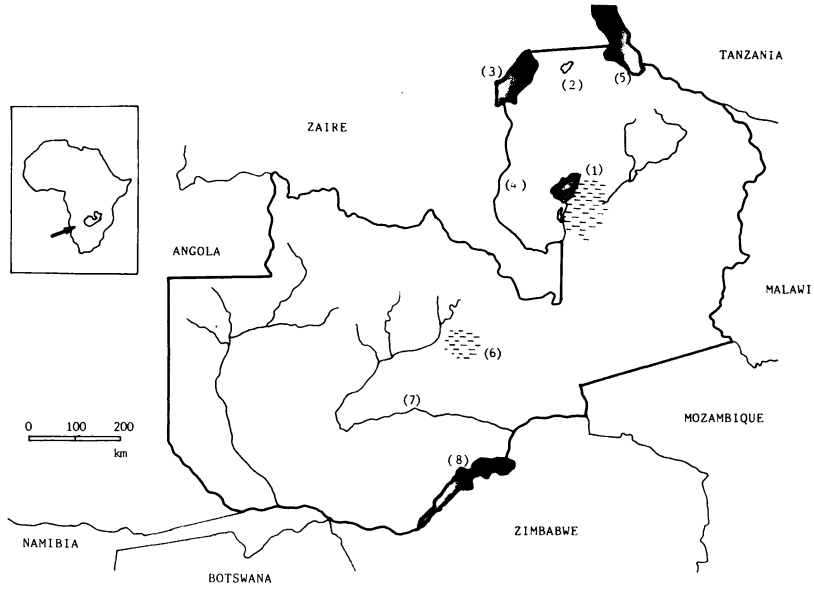

Fig. 1. Map of Zambia.

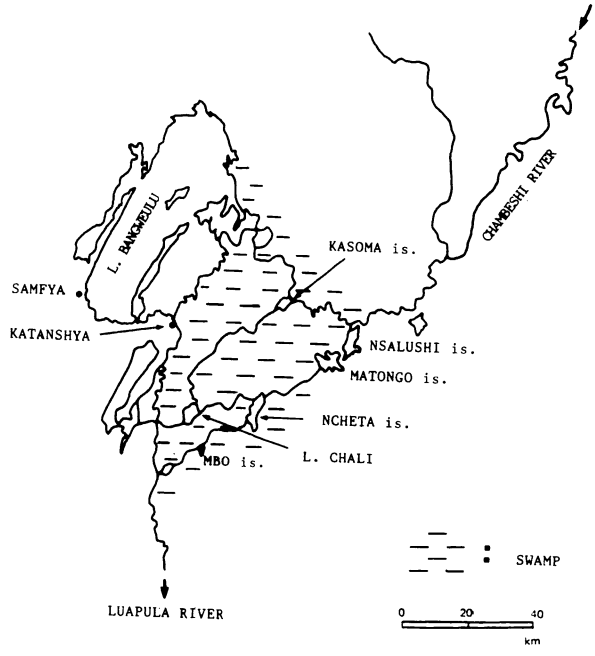

Fig. 2. Map of Bangweulu Fishery.

account for 24.4% of the total amount of catch in Zambia. Most of them were taken from the swamps. The fish catch caught in other fisheries in Zambia also include the catch by the swamp fishing, which account to nearly 50% of the total catch by estimate. Nevertheless, no studies of swamp fishing have ever been carried out in Zambia or other countries. This paper first describes the organization and methods of the fishing, and fishing activities of each commercial fishing method. Secondly, it analyses contents of the catch and examines the activity pattern by which fishermen can get a maximal catch with minimal labour input. It also describes the disposal of the catch to sale, and finally examines the significance of swamp fishing upon the whole life of the fishermen which includes their mutual utilization of the swamp environment. It is based on the data obtained from field research among the fishermen at the fishing camp in the swamps located in the south-eastern side of Lake Bangweulu. During the research period, from September, 1983 to January, 1984, the author stayed at a fishing camp and carried out his research about the fishing life of the swamp fishermen from a socio-ecological point.

RESEARCH AREA AND FISHERMEN

Lake Bangweulu has an area up to 2,000km^2, and is located in Luapula Province in Zambia (Fig. 2). Samfya, on the western shore of the lake, is the biggest town and the executive centre of the Samfya district. The great swamp which stretches widely to the south and south-east of Lake Bangweulu is about 5,000km^2 in extent at the end of the rainy season. The swamp is dotted with islands, such as Ncheta, Kasoma.

People living on the islands and mainland around the lake enter into the swamps for fishing in the dry season (April to November). The water level of the swamp falls down gradually in this season. They put up their sheds on the banks of the channel or floating islands to form a fishing camp and to perform their seasonal fishing. They smoke their catch and sell them to the traders who come into their fishing camp. The main object of their fishing is to sell for cash. Swamp fishing has become more than a subsistence activity with the development of the market since the colonial days. Brelsford (1946) states that the commercial route of fish to Copperbelt market was established by 1924. There are some ethnographies in existence about the people living around Luapula River and Lake Bangweulu (Brelsford 1946, Cunnison 1959).

Fishermen of the Bangweulu swamps come from the mainland villages around the lake or the dotted islands in the swamps. Mainland groups are the N'gumbo, the Kabende, the Bisa and others. Swamp islanders are the Unga alone (Fig. 3). According to the census by the Administration (Final Report, 1974), the total population of the N'gumbo is about 40,000, the Kabende 35,000 and the Unga 16,000. All of them are Cibemba speaking and cassava or maize cultivating people. As they have been working in copper mines seasonally since the colonial days, they are ready to fish in the swamps seasonally. It is said that the people who are called Batwa, living in Mbo island and Kansenga village on the western shore of River Luapula, make their living mainly on fishing. Earlier researchers took them for the aboriginal inhabitants of a Bushman or Pygmy type, and they are said to be sent away to a remote place (Longworthy, 1971). The author could not find out anything clearly about the Batwa in that research area. Kakeya *et al.* (1983) also could not confirm their existence in the Lukanga Swamps other than in the Bangweulu area. People in the Bangweulu area assert that their existence is clear. They always mention the Batwa as the most uncivilized people in the swamps, and that the Batwa people themselves to be the "other" groups, the Unga, the Kabende and so on.

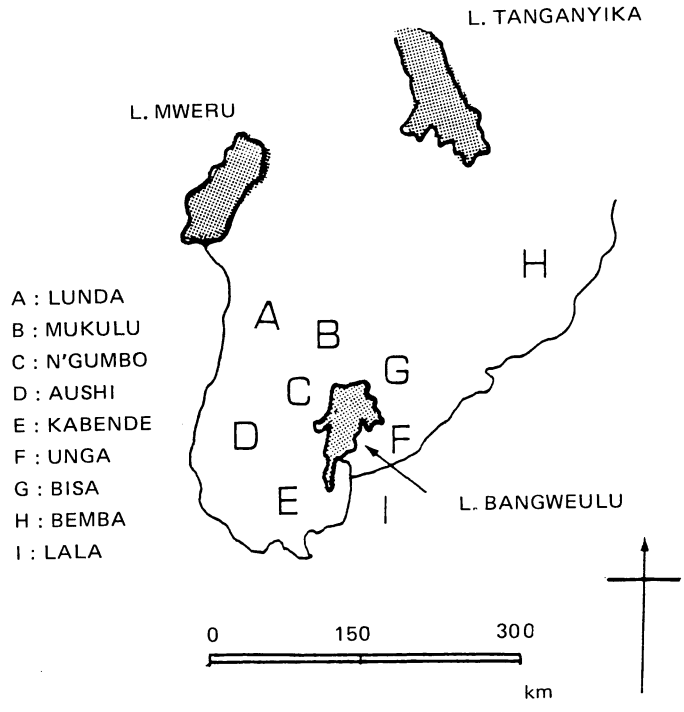

Fig. 3. Geographical distribution of the ethnic groups around the Lake Bangweulu.

A N'gumbo informant told the author that the Unga can be regarded as the Batwa also, for they are swamp dwellers. Regardless of their existence, it can be said that the Batwa is a legendary group in the swamps who specialize in swamp fishing and are looked down upon by the mainland groups.

NATURAL ENVIRONMENT

1. Physical and Chemical Environment

The Bangweulu Swamp is at an altitude of about 1,100m, and it is up to 4~5m in depth (Tait, 1965). The swamp is dotted with small and flat islands. Several rivers flow into the swamp area besides Chambeshi River, from the north eastern side and the outlet river Luapula a flows out from the south western corner to Lake Mweru. As for other characteristics of the water system, there are canals and channels dug, which tie the dotted lagoons to each other in the swamps. These channels are usually used by the swamp fishermen.

According to Tait (ibid.), the PH of the water is rarely above 7,0 and is generally acid. In the dry season, the water becomes generally stagnant with little oxygen and has a brownish red colour with phosphate and iron. Fishes are confined to the channels, rivers and open lakes in this season, because they avoid the stagnation in the swamps. After it rains, the swamp water mixes with the floods and is replaced by river water with a high oxygen concentration. Fishes spread out again over the swamp area. During the rainy

season, November to April, the annual rainfall for the six months is in the range of 1,300～1,400 mm (Climatological Summaries for Zambia, 1971). After this season, the rivers pour water into the swamps, so that April and May are months of the highest waterlevel in the swamps. In July and August, there is a gradual fall which is accelerated during the period that is close to November. Early December, just before the rainy season, is normally the period of the lowest water level. Therefore the fishermen can fish actively in the swamps during the period from the middle of April to the middle of December. Fig. 4 indicates the rainfall and the water level of the lake recorded at Samfya from July, 1982 to June, 1983.

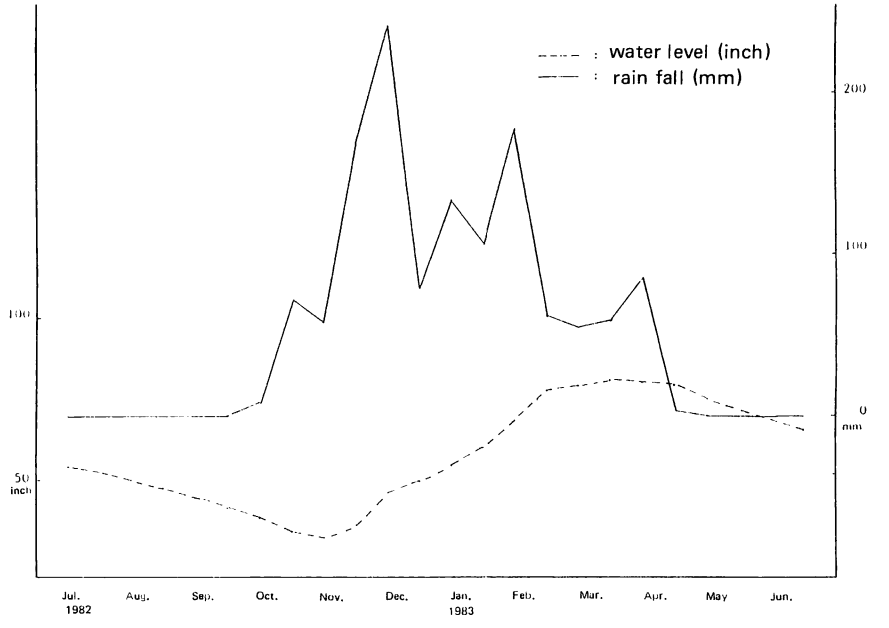

Fig. 4. Water level and rainfall at Samfya.

2. Vegetation and Fauna

The study camp of the author is located on the bank of the channel a few kilometers east of Lake Chali at the western end of the swamps. Around the camp, there is overgrown with papyrus and reeds, but there are no trees. Waterlilies and weeds such as Genus *Eleocharis* (*amashinge*) can be found in channels and lagoons.

86 species of fish are recorded from the Bangweulu region. Of these species, 33 are of commercial importance (Tait, ibid.). During the research period, fishermen of the camp caught 33 fish species indicated in Tab. 1, and they consumed all of their catch. Fish identitfcation was done by Dr. Ichikawa and the author with reference to the check list by P. B. N. Jackson (1961). As described above, fishes are confined and spread out seasonally according to the quality of water. Some of the fish breed at the end of the year before the dispersal (Tait, ibid.).

As to the mammals, except for elephant and lechwe entering into the marsh around the swamps in the dry season, hippopotamus live in the water, which have little effect on the life of fishermen. However, a kind of otter frequently causes damage to the catch by stationary gill net fishing. As many crocodiles inhabit the open water, channels and lakes, it sometimes happens that fishermen are attacked by a crocodile in the fishing camp.

Table 1. Fish species recorded in the research area.

Species	vernacular name
MORMYRIDAE	
Mormyrus longirostris Boulenger	*mbubu*
Mormyrops deliciosus (Leach)	*lombo*
Marcusenius monteirii (Gunther)	*ncesu*
M. macrolepidotus (Peters)	*mintesa*
Petrocephalus simus Sauvage	*cise*
P. catostoma (Peters)	*cipumamabwe*
CHARACIDAE	
Hydrcyon vittatus Castelnau	*nsanga*
Alestes grandisquamis Boulenger	*matula*
A. macropthalmus Gunther	*manse*
A. imberi Peters	*lusaku*
CITHARINIDAE	
Distichodus maculatus Boulenger	*lubala*
CYPRINIDAE	
Barbus banguelensis Boulenger	*mumbulwe*
Labeo altivelis Peters	*mpumbu*
SCHILBEIDAE	
Schilbe mystus (Linneaus)	*lupata*
CLARIDAE	
Clarias gariepinus Peters	*umuta*
C. ngamensis Castelnau	*umuta*
C. obscurus Poll	*cimpule*
C. theodorae Weber	*mulonfi*
C. buthpogon Sauvage	*bomba*
Heterobranchus longifilis Valanciennes	*sampa*
MOCHOKIDAE	
Synodontis ornatipinnis Boulenger	*bongwe*
S. nigromaculatus	*cinymba*
BAGRIDAE	
Chrysichthys mabusi Boulenger	*kabonbola*
Auchenoglanis occidentalis C.& V.	*mbowa*
CICHLIDAE	
Sarotherodon macrochir Boulenger	*nkamba*
Tilapia rendalli Domeril	*mpende*
T. sparmanii Smith	*matuku*
Serranochromis angusticeps (Boulenger)	*polwe*
S. robustus (Gunther)	*nsuku*
S. thumbergi (Castelnau)	*ntasa*
Haplochromis mellandi (Boulenger)	*mbilia*
Tylochromis bangwelensis Regan	*nsangula*
ANABANTIDAE	
Ctenopoma multispinis Peters	*nkomo*

FISHING LIFE

As stated in the previous chapter, most of the fishermen in this area do not fish all the year round. They cultivate cassava and maize around their main village, so that they are dependent on the yield of agriculture. As their subsistence basis is agriculture rather than fishing, so the period of fishing is dominated by the schedules of their cultivation and water level in the swamps. From January to March, most camping sites are flooded because of the rains, so no types of fishing are possible in this period. The cultivation and the fishing calendar of the Unga and the N'gumbo is shown in Fig. 5. The actual period of fishing differs a little among the fishermen. Abundance of cultivable land is favoured by the N'gumbo, so they are able to perform slush and burn agriculture for cassava cultivation more widely, as they find it more difficult to approach the swamps than the Unga. It can be said that the difference of cultivation, especially that of cassava, is related to the difference of fishing activity of these groups. In order to appreciate the swamp fishing that is connected with the system of cultivation, it would be necessary to have a more detailed study including that of the main village of the fishermen. In this chapter, the author draws his attention only to the fishing life in the swamp area. He describes and analyses their fishing unit, methds and catch.

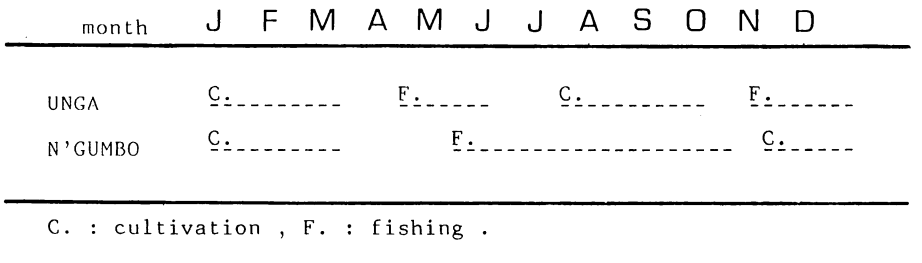

Fig. 5. Fishing calendar of the Unga and the N'gumbo.

1. Fishing Camp and Production Unit

i) Fishing Camp

Fishermen call their fishing camp *pamitanda*. Dr. Kakeya (per. comm.) informed the author that the Bemba people in the eastern side of the swamps put up their sheds for slush and burn agriculture called *pamitanda* in the process of *Citemene* system for finger millet cultivation. A fisherman who is to fish himself at *pamitanda* makes preparation for fishing before the fishing season according to his programme. He must provide materials for his shed, fishing gear, fuel (woods), foods and a canoe by which these things are carried to *pamitanda*. Trees are never grown around *pamitanda* as described in the former chapter, so that the fishermen have to take materials for their sheds into his *pamitanda* by canoe.

They cut down trees in the secondary forest on the mainland for putting up the frame of a shed (*umutanda*) before they enter into the swamps. They prefer the frame trees as follows: *Combretum mechouianum* (*umufuka*), *Albizia adianthifolia* (*umubanse*) *and Kigelia africana* (*umufungu*).

Fig. 6 shows a *umutanda* in construction. Unga fishermen usually use *matete* reed (*Phragmites mauritianus*) grown in the swamps as the frame of *umutanda*, unlike the mainland people such as the N'gumbo. The Unga area is in the swamps where tree cannot be found a lot, therefore they have to provide materials for making the frame of *umutanda* in the swamps.

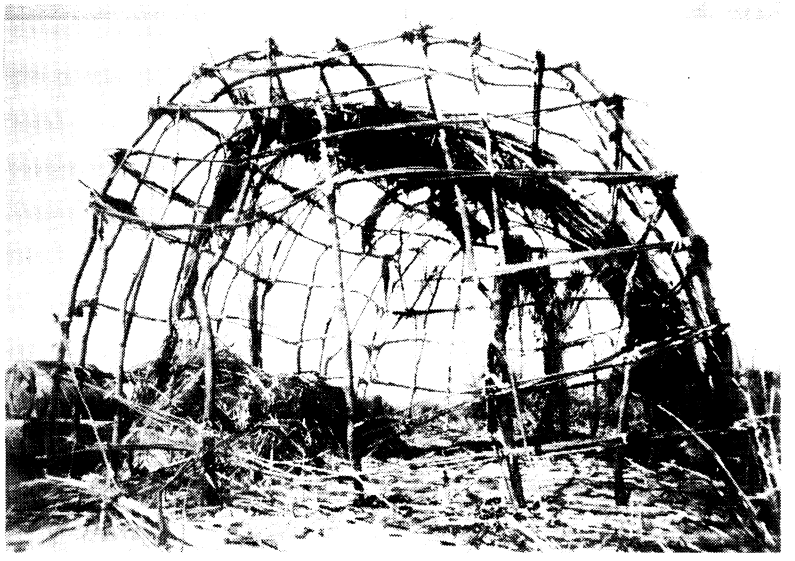

Fig. 6. *Umutanda* in construction.

Frame poles are bound by leaves of papyrus (*ulko*) to each other which easy to get in the swamps. Stalks of shrubs grown in the swamps such as *Asschynomene fluitans* (*umusekese*) are laid across the poles stuck in the ground. The frame of *umutanda* is thatched with grasses such as *Vossia cuspidata* that is grown near the *pamitanda*. Thatching grasses are generally called *amafu*. Fishermen add more *amafu* on the roof for fear of leaking just before the rainy season. Their canoes are manufactured mainly on the land at the eastern side of the swamps after the rainy season. People who finish making their canoes at the end of August take them into the swamp area in groups and sell them to fishermen in the fishing camps. People insist on it that the best tree for making a canoe is *Afzelia quanzensis* (*mupapa*). A good canoe of this tree lasts more than 10 years. The next best tree is *Pterocarpus angolensis* (*mulombwa*). According to the exhibition of Moto Moto Museum in Mbala, a canoe is also made from other trees as *Entandrophrawa caudatum* (*mofu*), *Albizia anttumesiana* (*musase*), A. *adianthifolia* (*umubanse*), *Vitex* spp.(*mubanse*) and *Afromosia angolensis* (*mubanga*). It is said that canoes made from these trees are hard, but apt to split easily.

The fishing grounds and camps are regarded as open to anyone in the swamps as Brelsford (ibid.) states. Therefore, a *pamitanda* is never occupied to stay by a particular group of fishermen. Every *pamitanda* is registered to a chief of the area, and fishermen must have a fishing licence from the Administration. Besides this, there is a custom to pay tribute to the chief of the area. Sometimes a man from one chieftainship goes around *pamitanda*s to levy tribute, but it is not levyed strictly. Chieftainship or fixed membership do not exist in a *pamitanda*. Although *pamitanda*s are not organizationally connected each other, fishermen take a holiday every Sunday, and have a chance to visit other *pamitanda* for taking some alcholic drinks (*ombwa*, *mandalakwa*), which are made from maize powder or finger millet, and sugar. Like this, *pamitanda* does not stand alone.

The people who have kinship relationships to each other living in the same or neighbouring village are apt to concentrate in a particular camp for fishing. Fishermen of the Unga, N'gumbo and Kabende, who are shown in Fig. 7 and 8, have utilized the study

Fig. 7. Fishing unit in the study camp.

unit	persons	method	1983 Jan. Feb. Mar. Apr. May. Jun. Jul. Aug. Sep. Oct. Nov. Dec. Jan. Feb.
N'gumbo			
1. Mwa.	3	B3	
2. Rob.	1	B3	
3. Abi.	2	B3	
4. Eli.	1	B3	
5. Emm.	1	B3	
6. Seb.	1	B3	
7. Nel.	1	B3	
8. Bj.	3	B3	
9. Mpu.	3	B3	
10. Cha.	1	B3	
11. Ba.	3	B3	
12. Do.	2	B3	
13. Amo.	2	B3	
14. Mu.	1	B3	
15. Fe.	1	B3	
Unga			
1. Bai.	3	B3	
2. Obi.	5	Bla,b	
3. S.	5	Blb,2	
4. P.K.	1	Bla,3	
5. Yob.	2	Bla,b	
6. Ka.	2	Bla,b	
7. F.P.	2	Bla,b	
8. Le.	4	Bla,b	
9. Alf.	3	Bla,b	
10. Mwe.	3	Bla	
11. Cho.	1	Bla	
Kabende			
1. Tal.	3	Bla,b	
2. Fra.	2	Bla,b	
3. Hab.	1	Bla	
4. Sec.	2	Bla	

Bla : *Malalikishya*, Blb : *Ukusebeshya*, B2 : *Mkwao*, B3 : *Mukombo*, ——— : fishing period

camp and fishing grounds around the camp for a long time. Some fishermen of the same group have kinship relationships to each other. They form a fishing unit as described later, and carry on fishing together. Affinal relationships crossing the groups (the Unga and the Kabende) can also be found. Fishermen in *pamitanda* are not organized to each other through their kinship relations, but they fish as a member of the production unit of fishing independent from their relatives.

ii) Production Unit —*Nsanga*—

Swamp fishermen organize the fishing unit in which they fish together, the interest of which is to distribute the profits of the fishing among its members. People call it *nsanga*. This type of production unit of fishing cannot be found in the earlier reports about fishing except Tait (ibid.). He only states that frequently one fisherman employs several helpers. All the fishing activities for selling the catch are performed by each production unit

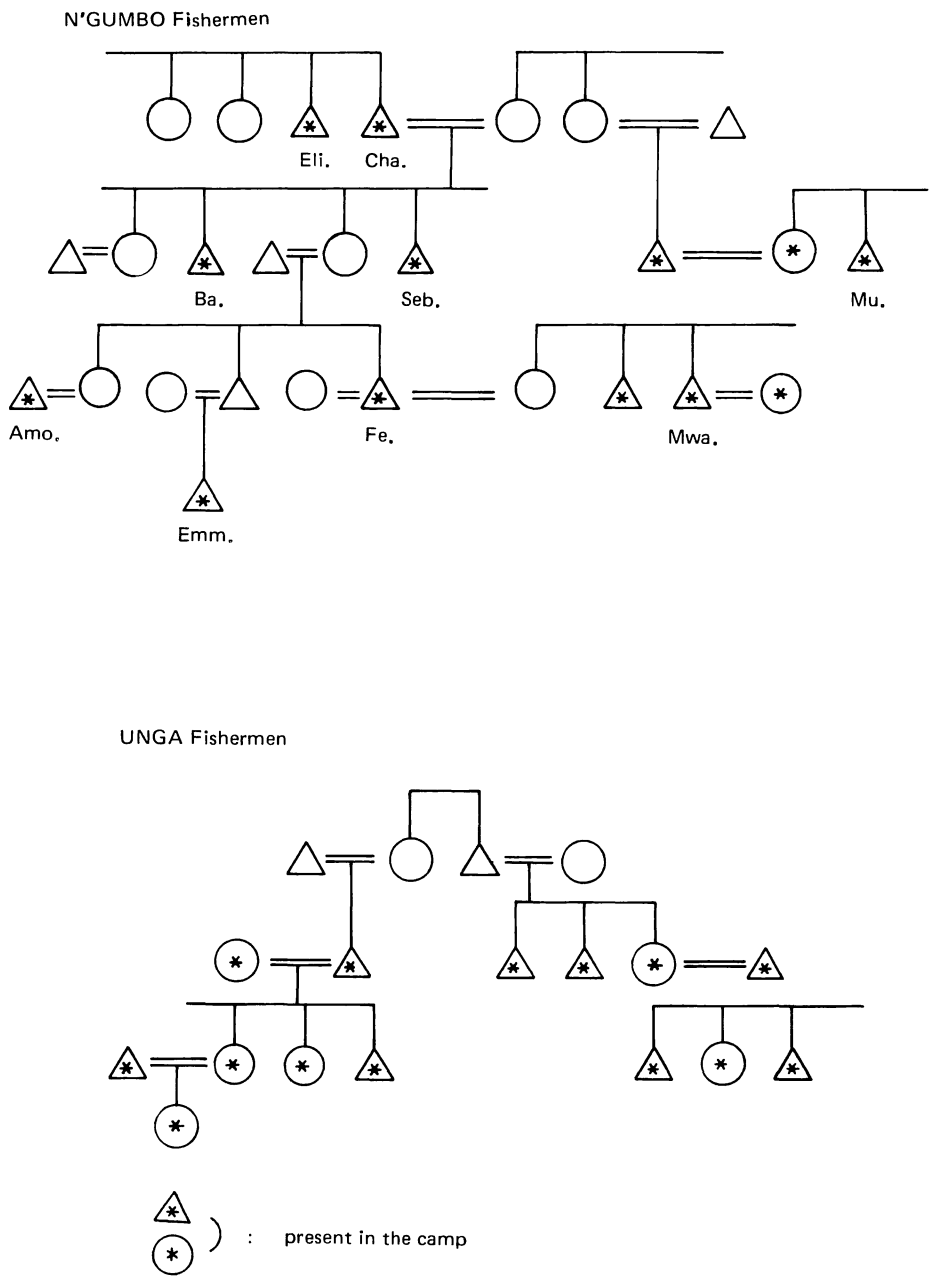

Fig. 8. Genealogies of the Unga and the N'gumbo fishermen.

independently. Even a solitary fisherman in *pamitanda* is recognized as a master of a production unit (*nsanga*) among the fishermen. For he can sell his catch to get profits individually. Each production unit adopts a particular fishing method as their commercial fishing method. In the following paragraphs, this type of production unit in the swamps is described.

One *nsanga* is composed of a representative fisherman (*umushila*) and his one or several co-workers (si. *umuswa*, pl. *abaswa*). In Bemba language, *umushila* means on independent fisherman who possesses his fishing gears (canoe, fishing net, etc.) and can fish himself in the swamps. That is to say that *umushila* preserves both capitals and techniques for swamp fishing. He also possesses a wire net for smoking fish, for fishermen have to process their fish catch in order to sell them. Conversely, *umuswa* (or *abaswa*) does not possess fishing gear of his own and he must depend upon *umushila*'s gear. He co-works with *umushila* for selling their catch. The union composed of *umushila* and *umuswa* or *abaswa* can be regarded as a production unit, which is recognized by fishermen themselves and it is named *nsanga*. One informant told the author that it should be called "company" because of its character for selling fish.

The relationship of a particular *umushila* and *umuswa* in a *nsanga* does not last for more than one fishing season. A N'gumbo informant said that a N'gumbo man who keeps fishing gear and can provide foods and wood, calls for his new *umuswa* or *abaswa* of the next season in February and March to be a *umushila*. Several men apply and converse with him about the fishing. After they agree in some respects to the fishing method, grounds, periods and the share of the profits, they become members of the same *nsanga* altogether.

Usually, a *nsanga* is composed of brothers-in-law (*mulamo*) rather than friends of the same village, father-son or brothers in a nuclear family. In many cases, a man and his wife's brother or a sister's husband are apt to form a *nsanga*. In the study camp, it was observed that one *nsanga* was composed of fishermen of the differnt groups, the Unga and the Kabende, for inter-group marriages are common in that research area. Brelsford (ibid.) does not point out the existence of the *nsanga* unit, but he states that any kind of family combination can be met, brothers, fathers, sons, cousins and often village friends or acquaintances. He also met a party in which Unga men joined Bisa or N'gumbo fishermen.

The share of profits is not fixed constantly among the *nsanga* members. It differs a little from *nsanga* to *nsanga*. Generally speaking, *umushila* can get more than other members, for he must supply other members with fishing gears and foods. That of an unskilled *umuswa* is lower. If a son of the *umushila* is one of the *abaswa*, he can get more cash than other members can. The author was told that in the case of a *nsanga* with 5 *abaswa*, in the study camp, *umushila* gets 30% of the profits and the rest of it is shared equally among the 5 *abaswa*. If a *nsanga* gets much more profit than that of their prediction, the *abaswa* complain about the decided share and a negotiation with the *umushila* is held over again in *pamitanda*. When a new decision by mutual agreement cannot be attained, the conduct of *umuswa* differs from Unga to N'gumbo. Unga fishermen usually share profit every time they sell to traders. On the other hand, N'gumbo *umuswa* receives his share at once in the mainland villages after the fishing period. In the study camp, two *abaswa* of *nsanga* Le shown in Fig. 7 seceded to return to their village in September, and they organized a new *nsanga* from November.

As described above, *nsanga* means a production unit that is composed of people connected with blood ties or affinity, and depends upon getting profits from selling fish. It can be supposed that this type of production unit began to be organized when this area was incorporated into the commercial cycle of fishing to the Copperbelt markets. *Umushila*

is recognized clearly among the people as an independent fisherman who has both fishing capitals and techniques. On the contrary, *umuswa* who does not possess these is treated as an inadequate fisherman. One N'gumbo informant said that every *abaswa* desires earnestly to become *umushila*.

2. Method

According to Mortimer (1965), methods of inland water fishing in use in Zambia can be divided into two main groups:

Group A. Small-scale Fishing Methods

Group B. Commercial Fishing Methods

Small scale fishing employs methods that have been in use for many years for a fishermen's self consumption. The fishing gear usually makes use of natural materials. On the other hand, commercial fishing is meant fishing for financial profit, and its methods of fishing make use of nets.

In the study camp, the greater part of the nets are made in Taiwan and China, rather than in Zambia. Net length is 50 yards each, depth of it is 26 meshes. Mesh size of net in use are 1.0, 1.5, 1.75, 2.0, 2.5, 3.0 inches. Fishermen can purchase them in the villages or from peddlers who come to *pamitanda*.

Gill nets are mounted on a rope at the top and the bottom. The head rope has floats and the foot rope sinkers. Long and slender type of floats (*intumpo*) are usually made of stalks of the shrub, *Triumfetta cordifolia* (*mamina*). Other types of floats in use, cork or plastic, can be purchased. Sinkers (*amabwe*) may be baked clay or stones. In this section, fishing methods for swamp fishing observed or interviewed in the study camp are described. Tab. 2 indicates a list of the fishing methods.

A. Small-scale Fishing Methods

The methods are classified as follows.

A1. Rod and Hook, Handlines (*Ndobani*)

A single hook is set on a line. The line may or may not be attached to a rod. The hook is baited with maize meal (*nshima*) or an earthworm (*ifyambo*) caught near *pamitanda*. Several species of fish such as *Alestes macropthalmus* (*manse*), *A. imberi* (*lusaku*), *Haplochromis mellandi* (*mbilia*) and *Tylochromis bangwelensis* (*nsangula*) were caught in the camp. Women and children who are left behind at *pamitanda* in the daytime frequently use this method for dish around their sheds.

A2. Longline (A2a. *Mwando*, A2b. *Akabamba*)

In this form of fishing, the long rope with baited hooks is stretched across an open stretch of water, just under the surface, for several hours. There are two forms of this fishing. One is *Mwando* used in the area of shallow water, and the other is *Akabamba* used in the area of deep waters. Only *Mwando* fishing could be observed in the research area.

A2a. *Mwando*

Lines in use are factory made artificial fibres. Each baited hook is attached to a long line at intervals of about a metre. The end of a line are attached either to the reeds at the sides of a channel or to poles stuck deep into the mud of open lagoons. The longline is set in still water in the morning and put in the water over night. The fishes caught are collected on the next morning, and baits are exchanged for new ones at that time. A cut of Genus *Marcusenius* or *Petrocephalus* is used as bait. An earthworm (*ifyambo*) or internal organs of a fish may be used. The inspection and collection of catch are done repeatedly for several days. The point of setting longline is changed when the catch of fish decreases. The type of fish frequently caught are Barbel fishes (Genus *Clarias*), Tiger fish (*Hydrocyon vittatus*) and others.

Table 2. Fishing method.

A.	Small scale fishing method		
1.	a.	*indobo*	handline
	b.	*umulindi*	rod and hook
2.	a.	*mwando*	longline (in swamps)
	b.	*akabamba*	" (in lakes)
3.		*semu*	lures
4.	a.	*ukuela*	scoop net
	b.	*ulwanga*	scoop baskets
5.		*ubwamba*	weir
6.		*ubwela*	spearing
7.		*ububa*	fish poison
B.	Commercial fishing method		
1.	a.	*malalikishya*	stationary gill net (one night)
	b.	*ukusebeshya*	" (several hours)
	c.	*mutobi*	" (several nights)
2.	a.	*mkwao*	seine net (in swamps)
	b.	*kapopela*	" (in lakes)
3.		*mukombo*	driving fish
4.		*ukukunguluka*	drifting net

A2b. *Akabamba*

A longline is stretched across an open lagoon or lake. The total length of a line reaches up to 100 m, and the number of hooks used are 200, which is more than that in *Mwando* fishing. Fishermen set it in the morning and collect catch in the afternoon. *Auchenoglanis occidentalis* (*mbowa*) , *Hydrocyon vittatus* (*nsanga*) and *Synodontis nigromaculatus* (*chinymba*) are caught. This form of fishing can be set up at Lake Chali in the research area.

A3. Lures (*Semu*)

It is said that spinners have been adopted by fishermen who have copied those of European anglers. But this method was not to be observed in the research area.

A4. Scoop Baskets (*Ukuteya*)

This is a fishing method using a basket (*ulwanga*) or a mosquito net (*candaluwa*). It is used normally by women, boys and girls in shallow water area. The type of fish captured by this fishing method are small frys of *Alestes macropthalmus* (*tala*), *Barbus banguelensis* (*mumbulwe*) and *Haplochromis mellandi* (*mbilia*). It is frequently used in the period of October to November, when these frys can be seen easily in the channel in front of the *pamitanda*. The *ulwanga* or *candaluwa* is used scoop fashon, being pushed in front of the women with the open mouth forward. Other persons drive the frys into the basket from the upper side.

A5. Weir Fishing (*Ubwamba*)

In this type of fishing, the basket (*umono*) and the weir or the fence (*ubwamba*) are both used. *Ubwamba* is made of mud in the channel. *Umono* is set between the *Ubwamba* and people drive fishes into the *umono* from the upper side. This is the method for catching *mintesa* or *ulupata* fish (*Marcusenius macrolepidotus*, *Schilbe mystus*).

A6. Spearing

Spears are used by fishermen from their canoes. Fishes of Genus *Clarias* (*milonge*) breed at the end of the year, and they are in activity even in the daytime. Fishermen go

through the water throwing spears into the water of channels or lagoons. As it is difficult to smoke *Clarias* fish because of its size (50～100cm), a lot of raw fishes of *Clarias* are carried into the village markets on the bank, so that the price of *Clarias* fish falls heavily in this season.

A7. Fish Poison (*Ububa*)

As this method is used mainly in narrow rivers or small marshes near the villages on the islands or on the mainland, it could not be seen in the swamps. In this method, people blockade a definite area of shallow water and scatter pounded, soaked leaves or roots into the water. It is difficult to blockade a definite area in the swamps, especially around *pamitanda*. This method cannot be regarded as a method of swamp fishing. It can be pointed out that this is used exclusively by women. Women who were staying in the study camp have more knowledge of poisonous plants than fishermen. Informants of N'gumbo and Unga women gave the author 5 plants of fish poison as shown in Tab. 3a. The exhibition of Moto Moto Museum in Mbala points 7 plant species for fish poison as shown in Tab. 3b.

B. Commercial Fishing Method

The methods of fishing in use make use of fishing nets. These are of three main types as follows:

B1. Stationaly Gill Net

B2. Seine Net

B3. Driving Fish

B1a. Stationary Gill Net (one night) —*Malalikishya*—

Fishermen set the nets with floats and sinkers on the surface of the water in the evening, and collect the catch the next morning. Setting the nets of stationary gill net is called *ukuteya*. *Malalikishya* fishing is used popularly in the early and later period of the rainy season (December-January, April-May). Frequent occurence of rain prevents fishermen from using types of fishing in the fishing grounds other than this method. The great majority of catch for selling is gained by *Malalikishya* method in these periods.

Table 3a. Plants for fish poison.

akaba	? (shrub)
akapofwe	? (〃)
akasusu	? (〃)
akacene	? (〃)
imibaka	*Amblygonocarpus andongensis*

Table 3b. *Ububa* plants for stunning fish (exhibited in Moto Moto Museum).

kansakata	*Clolichos* spp.	roots
kobamushi	*Tephrisia vogeli*	leaves, rods
mufinsa	*Syzygium guineense* sub sp.	bark, chips
munengene	*Swartzia madagascariensis*	fruit
nakancete	*Bersoma abyssinica*	leaves
cibonimusuba	*Euphorbia* spp.	
kanyemya	?	leaves, roots

Fishermen may use it in other periods, but they set their nets irregularly and reduce the number of nets set, so that the catch by *Malalikishya* fishing occupy no more than what is used for self-consumption for each *nsanga*. Catch by *Malalikishya* varies much according to mesh size of the nets used and fishing season. In its best fishing season (December-January, April- May), *mintesa* fish (*Marcusenius macrolepidotus*) and *matuku* fish (*Tilapia sparmanii*) are caught much. Other than these species, fishes of Genus *Clarias*(*milonge*), *Schilbe mystus* (*ulupata*) and *Synodontis nigromaculatus* (*chinymba*) are becoming to be caught much in November and December. Tab. 4 indicates the number of fish per each species and total weight caught by *Malalikishya* fishing of 6 *nsanga*s in the study camp. Contents of catch varies according to mesh size of net. Mormyridae fishes occupy 48.8% of catch by the net of 1.5 ins. mesh size. Catch of Mormyridae fish by the net of more than 1.5 ins. mesh size reaches only to 17.4%, which makes a clear contrast with that by 1.5 ins. net. Total weight of catch per net(total length of it is about 100 yard) is 2.51kg (1.5 ins.) and 2.66kg (1.5 ins. <), so it does not vary much according to the mesh size of the net. It can be pointed out that fishermen get on unbiased catch by *Malalikishya* fishing. *Malalikishya* fishermen themselves take little notice of the mesh size, and they use various mesh sizes, for they do not intend to catch any particular species of fish by this method. However, most fishermen who use this method in order to catch Mormyridae fish in December to January adopt the nets of 1.5 ins. mesh size.

B1b. Stationary Gill Net (several hours) —*Ukusebeshya*—

The type of net used in this fishing is the same as the net of *Malalikishya*. *Ukusebeshya* fishermen set the nets and watch and wait for several hours (4-5 hours) at the side of the nets. Nets are set in the evening (4: 00-8: 00 P. M.) or early morning (1: 00-5: 00 A. M.). People call these fishings *Ukusebeshya icungulo* (evening), *Ukusebeshya kumaca* (early morning). Fish caught by *Ukusebeshya* fishing of 3 *nsanga* in the study camp were recorded. The fish species caught, its number and weight of some fish families are shown in Tab. 5a, b. According to this table, although the number of *Tilapia sparmanii* (*matuku*) is the greatest, the weight of Mormyridae fishes caught occupies 58% of the total weight of catch in *Ukusebeshya icungulo* fishing. In *Ukusebeshya kumaca* fishing, the number of *Marcusenius macrolepidotus* (*mintesa*) is the greatest, and the weight of Mormyridae fish occupies nearly 80% of the total weight. It can be said that *Ukusebeshya* is the fishing method that aims to catch Mormyridae fishes. That can be seen more clearly in *kumaca* fishing. The weight of catch by this method per net is 2.0kg (*icungulo* fishing) and 2.3kg (*kumaca* fishing). These are less than that by *Malalikishya* fishing. We can say this because the length of stationary time of *Malalikishya* fishing is longer than that of *Ukusebeshya*. The catch of *Marcusenius macrolepidotus* (*mintesa*) and *Petrocephalus catostoma* (*cipumamabwe*) are especially large as compared to other Mormyridae fishes by this fishing method. These fishes cannot be caught with a net of larger mesh size (more than 1.5 ins.), for they can pass through the net. Because they are so small in size that fishermen usually prefer the net of mesh size 1.5 ins..

Ukusebeshya fishermen leave *pamitanda* for *icungulo* fishing at about 4: 00 P. M. , and for *kumaca* fishing at about 1: 00 A. M. They carry several number of nets (about 100 yards each) in their canoe to the day's setting points (*ifyelo*). They set the nets, watch and wait there for 3 or 4 hours, and collect them. Fishermen have to watch and wait there to prevent otter (*mukobe*) or *Clarias* fishes (*milonge*) from damaging catches and destroying the nets. In fact, catches or nets are damaged by them frequently in *Malalikishya* fishing. Fishermen in their canoes at night are continually attacked by mosquitoes which inhabit the swamp area abundantly. They are compelled to take great pains in order to guard themselves from the mosquitoes. They return to *pamitanda* from *icungulo* fishing at about 8: 00 P. M. ,

Table 4. Catch by *Malalikishya* fishing (in number).

Species	mesh size of net	
	1.5 ins. <	1.5 ins.
Mormyrus longirostris	5	
Mormyrops deliciosus	2	1
Marcusenius monteirii	3	16
M. macrolepidotus	69	6,348
Petrocephalus simus		13
P. catostoma		480
Hydrocyon vittatus	4	2
Alestes macropthalmus		7
A. imberi	1	4
Distichodus maculatus		11
Barbus banguelensis		18
Labeo altivelis		
Schilbe mystus	7	84
Clarias gariepinus	13	85
C. ngamensis		248
C. obscurus		18
C. theodorae		182
C. buthpogon	1	58
Synodontis ornatipinnis		
S. nigromaculatus	5	87
Auchenoglanis occidentalis	3	16
Sarotherodon macrochir	17	43
Tilapia rendalli	12	50
T. sparmanii	114	7,572
Serranochromis angusticeps	48	70
S. robustus		16
S. thumbergi	8	18
Haplochromis mellandi	35	690
Tylochromis bangwelensis	16	33
Ctenopoma multispinis		3
number of net	16	219
number of *nsanga*	3	3
catch in kg (Mormyridae fish)	42.5 (7.4)	548.8 (267.7)
catch per net in kg	2.66	2.51

Table 5a. Catch by *Ukusebeshya icungulo* fishing (in number).

Species nsanga	Fr.	Ka.	S.	total
Mormyrus longirostris	3	3	5	11
Mormyrops deliciosus	20	16	13	49
Marcusenius monteirii	110	490	1,025	1,625
M. macrolepidotus	2,412	3,507	8,475	14,394
Petrocephalus simus	62	117	81	260
P. catostoma	507	1,051	1,184	2,742
Hydrocyon vittatus		20	15	35
Alestes grandisquamis		2	1	3
A. macropthalmus	1	15	3	19
A. imberi	8	31	50	89
Distichodus maculatus	29	28	20	77
Barbus banguelensis	3	4	19	26
Labeo altivelis				
Schilbe mystus	117	143	67	327
Clarias gariepinus			2	2
C. ngamensis	2	2	4	8
C. obscurus	2	6	2	10
C. buthpogon		1	1	2
Synodontis ornatipinnis			3	3
S. nigromaculatus	39	47	23	109
Chrysichthys mabusi	1	3		4
Auchenoglanis occidentalis	4	6	5	15
Sarotherodon macrochir	7	77	145	229
Tilapia rendalli	26	17	78	121
T. sparmanii	2,194	6,362	8,393	16,949
Serranochromis angusticeps	36	71	52	159
S. robustus	3	4	9	16
S. thumbergi	10	32	39	81
Haplochromis mellandi	113	342	301	756
Tylochromis bangwelensis	58	87	92	237
Ctenopoma multispinis	6		3	9
fishing nights	12	27	29	68
number of nets	96	181	297	574
catch in kg total	170.4	370.6	627.9	1,168.9
Mormyridae	104.3	185.0	390.8	680.1
Cichlidae	62.2	181.6	237.1	480.9
catch per net in kg	1.78	2.05	2.11	2.04

Table 5b. Catch by *Ukusebeshya kumaca* fishing (in number).

species *nsanga*	Fr.	Ka.	S.	total
Mormyrus longirostris	1	1	1	3
Mormyrops deliciosus	23	25	6	54
Marcusenius monteirii	144	165	370	679
M. macrolepidotus	3,120	5,137	7,156	15,413
Petrocephalus simus	60	85	56	201
P. catostoma	409	885	1,054	2,348
Hydrocyon vittatus	2	1	15	18
Alestes grandisquamis		1	28	29
A. macropthalmus		3	55	58
A. imberi	3	1	55	59
Distichodus maculatus	3	9	5	17
Barbus banguelensis	8	1	17	26
Schilbe mystus	204	220	96	519
Clarias gariepinus	1		2	3
C. ngamensis	1	5	1	7
C. obscurus	2	2		4
C. buthpogon		2	1	3
Synodontis ornatipinnis				
S. nigromaculatus	148	75	63	286
Chrysichthys mabusi	3	2	5	10
Auchenoglanis occidentalis	3	1	2	6
Sarotherodon macrochir	2	8	28	38
Tilapia rendalli	6	6	9	21
T. sparmanii	1,110	1,138	2,919	5,167
Serranochromis angusticeps	18	17	14	49
S. robustus	2	1	3	6
S. thumbergi	1	2	4	7
Haplochromis mellandi	31	46	113	190
Tylochromis bangwelensis	14	24	16	54
Ctenopoma multispinis	1		1	2
fishing nights	11	16	21	48
number of nets	88	138	147	373
catch in kg. total	180.7	275.4	401.6	857.7
Mormyridae	135.2	227.8	313.7	676.7
Cichlidae	30.6	42.7	79.9	153.2
catch per net in kg	2.05	2.00	2.73	2.30

and from *kumaca* fishing at about 6: 00 A. M. . Many *nsanga* perform both fishings of *Ukusebeshya* (*icungulo* and *kumaca*) during the night. If the number of nets possessed by the *nsanga* are not enough for both fishings, fishermen must take the fish out from the nets immediately after their returning from *icungulo* fishing in order to use the nets again for *kumaca* fishing. When a *nsanga* possesses enogh nets, it can use half of their nets in each fishing. *Nsanga* Ka in the study camp had 7 nets, and they used all of them for *icungulo* fishing. They had to take the fish out of them in order to use them for *kumaca* fishing. It could be said that their 7 nets were used of 14 nets in every night.

Generally speaking, shallow water areas around floating islands (*sela* or *umufunsu*) are preferred as setting points of nets (*ifyelo*) in *Malalikishya* and *Ukusebeshya* fishing. It is believed that Mormyridae fishes conceal themselves under *sela* or *umufunsu* in the daytime. *Sela* means the grasses over the water. Fishermen explain that Mormyridae fishes begin to be active in the evening (*icungulo*), and come to an end in the early morning (*kumaca*). They put their nets in front of the den of Mormyridae fish in the beginning and at the end of time in activity.

B1c. Stationary Gill Net (several days) —*Mutobi*—

This type of fishing is similar to the former two methods (B1a, b) in the point that it is also a stationary gill net method. In this type of fishing, a large mesh size net (more than 4 ins.) of thick string is used. The fisherman who sets *Mutobi* net patrols it every day, and collect the catch from the net in the water. This type of collecting catch is called *ukulola*. Fishermen may collect by *ukulola* in their *Malalikishya* or *Ukusebeshya* fishing, if the number of nets and catch are not much. Patrol of the net and collecting catch are done over again for several days. When the daily catches diminish, the point of net is changed to another place.

The size of fish caught by *Mutobi* net is rather large because of its large mesh size. The fish species caught are *Serranochromis robustus* (*nsuku*), *Tilapia rendalli* (*mpende*), *Auchenoglanis occidentalis* (*mbowa*) and so on. As the number of catch is small (about 10 fish per day) in spite of the size of fish (over 30cm length), the total amount of catch by this method is less than that by the other two methods (B1a, b).

B2. Seine Net—*Mkwao*—

Fishermen make use of seine net as well as the stationary gill nets for their commercial fishing. This is divided into two types, *Mkwao* and *Kapopela*. The former is used on the beaches of the lakes, and in the upper Luapula River and even in the swamp areas. The latter is used on canoe in the open and deeper lakes or lagoons. In the swamps, running water at the fishing spot is always utilized for *Mkwao* fishing. At this point, it varies from stationary gill net methods (B1), the netting spot of which is an area in still water. Nets were usually made from the cord from motor car tyres before, however, in the study camp, seine net is made from heavy gaige nylon twine. Mesh size of it is 1,5 and 2,0 inches.

A *Mkwao* team is usually formed of three fishermen. There are *matepa* sticks at the ends of *Mkwao* net (Fig. 9). They first fix one *matepa* stick on the bank, and the folded net is stretched on the surface of water. A drawing rope (*amalushi*) is attached to another end of the net, and a man draws *amalushi* from the bank where the *matepa* is fixed, and it is taken care of by him. Another man on the canoe cares for the net and removes obstacles. People make use of the net with two *amalushi* when they draw it onto the beaches of the lakes. Fishermen can only use narrow areas for *Mkwao* in the swamps, so that they can use the net only with one *amalushi*. The net is put on the canoe after drawing, and they take out the captured fish from it. Fishermen do this fishing at night as well as *Ukusebeshya* fishing. Fishing hours are also the same, *icungulo* (4: 00 to 8: 00 P. M.) and *kumaca* (1: 00 to 5: 00 A. M.). It is also done in the daytime. People call the daytime *Mkwao*, *Mkwao akasuba*.

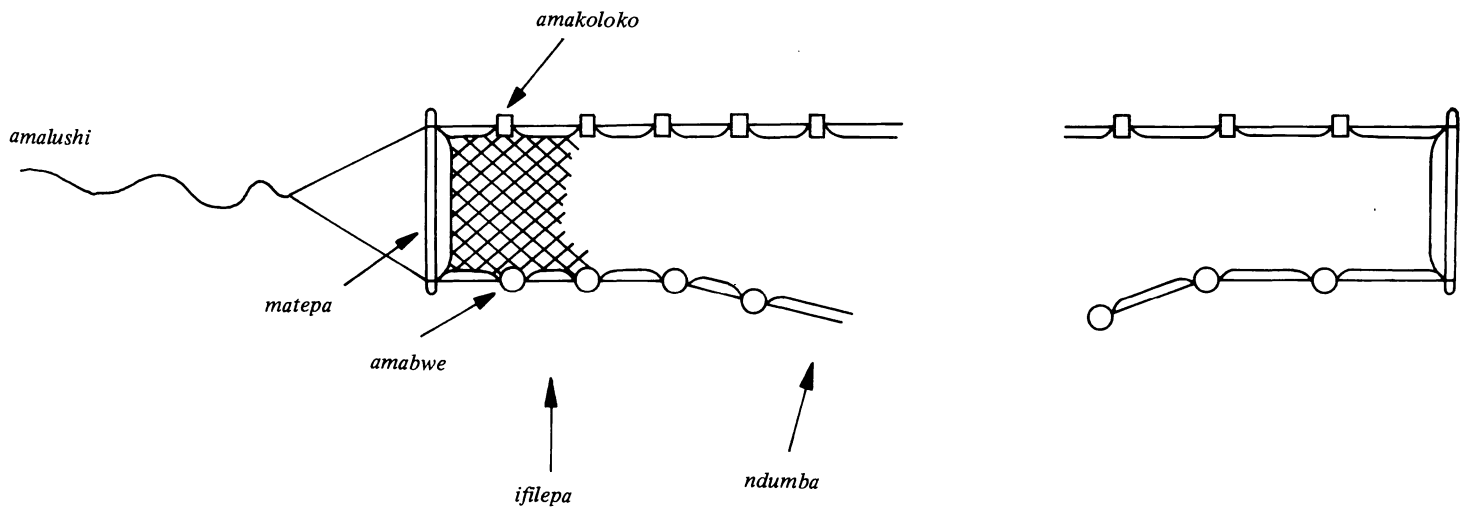

Fig. 9. Net for *Mkwao* fishing.

Fishermen leave *Pamitanda* for *icungulo* fishing at 4: 00 to 5: 00 P. M. and return to the camp at about 8: 00 to 9: 00 P. M. . Fish caught are already taken out at the *icungulo* fishing spot. Fishermen who engage in both kinds of fishings rest at *pamitanda* for 2 or 3 hours after *icungulo* fishing, and they leave *pamitanda* again for *kumaca* fishing at 1: 00 or 2: 00 A. M. . After they return to *pamitanda* at 5: 00 or 6: 00 A. M. , they begin to scrape the scales off the fish immediately.

As well as *Ukusebeshya* fishing, they set the net near the floating islands under which Mormyridae fish conceal themselves, and draw the *amalushi* at the time they begin to be active (5: 00 or 6: 00 P. M.). People can catch returning fish in *kumaca* fishing as well as *Ukusebeshya* fishing. The contents of catch by each *Mkwao* fishing (*akasuba*, *icungulo* and *kumaca*) recorded in the camp are shown in Tab. 6. It shows that the greater part of catch which is caught by daytime *Mkwao* (*Akasuba*) is occupied by Cichlidae fish, on the other

Table 6. Catch by *Mkwao* fishing (in number).

species	*icungulo*	*Kumaca*	*akasuba*
Mormyrus longirostris	1,795	339	
Mormyrops deliciosus	164	92	
Marcusenius monteirii	4,728	1,323	
M. macrolepidotus	16,431	12,188	
Petrocephalus simus	208	169	
P. catostoma	5,201	1,639	
Hydrocyon vittatus	7	1	3
Alestes grndisquamis		7	
A. macropthalmus	1	2	
A. imberi	8		
Distichodus maculatus	11	7	1
Barbus banguelensis	3	2	
Schilbe mystus	222	63	
Clarias gariepinus		6	
C. ngamensis	2		
C. obscurus	1		
C. theodorae		1	
C. buthpogon		1	
Synodontis nigromaculatus	28	42	
Chrysichthys mabusi	2		
Auchenoglanis occidentalis	4	3	
Sarotherodon macrochir	304	180	219
Tilapia rendalli	65	69	243
T. sparmanii	275	197	179
Serranochromis angusticeps	77	81	2
S. robustus	5	3	5
S. thumbergi	12	3	8
Haplochromis mellandi	145	64	34
Tylochromis bangwelensis	203	69	72
fishing days	52	32	2

hand, the majority of fish caught by night *Mkwao* (*icungulo*, *kumaca*) is Mormyridae fish. Sometimes, much *Tilapia sparmanii* (*matuku*) are caught by *Ukusebeshya* fising, conversely, very little by *Mkwao*. Fishermen say that *Mkwao* fishing is employed in a current which *matuku* fish do not inhabit.

B3. Driving Fish—*Mukombo*—

This is a popular method of gill net fishing known as *Ukutumpula* in the Mweru fishery. In the Bangweulu area, going *Mukombo* fishing is called *ukusakila*. Any number of fishermen can participate in a *Mukombo* fishing group in the same water area. Fishermen who employ *Mukombo* fishing at the same ground are called collectively *abamukombo*. The point of net setting is *icelo* in the singular as well as that of *Mkwao*. For each fisherman uses only one net in this method. Sinkers are not attached to the *Mkwao* net, which is called *kacaala*. The total length of it is 20~40m, and mesh sizes are 2 to 3 inches, it is made of fine twines. As the object of adopting *Mukombo* fishing is to catch larger fish, the net of small mesh size is too weak to be torn by fish.

In this fishing, fishermen decide *icelo* in shallow water and set their nets in a line at one side of the *icelo*. After setting their *kacaala*, they move to the other side and begin to drive the fish into the nets by thumping the water with poles (*akatole*) at the end of which are knobs of wood (Fig. 10). They collect the fishes which have been driven into their nets in this way. *Ukusakila* means all the processes of this fishing, setting *kacaala*, driving fish and collecting catch. Fishermen move their nets at short intervals (about 1 hour) to a new *icelo* and the process is repeated.

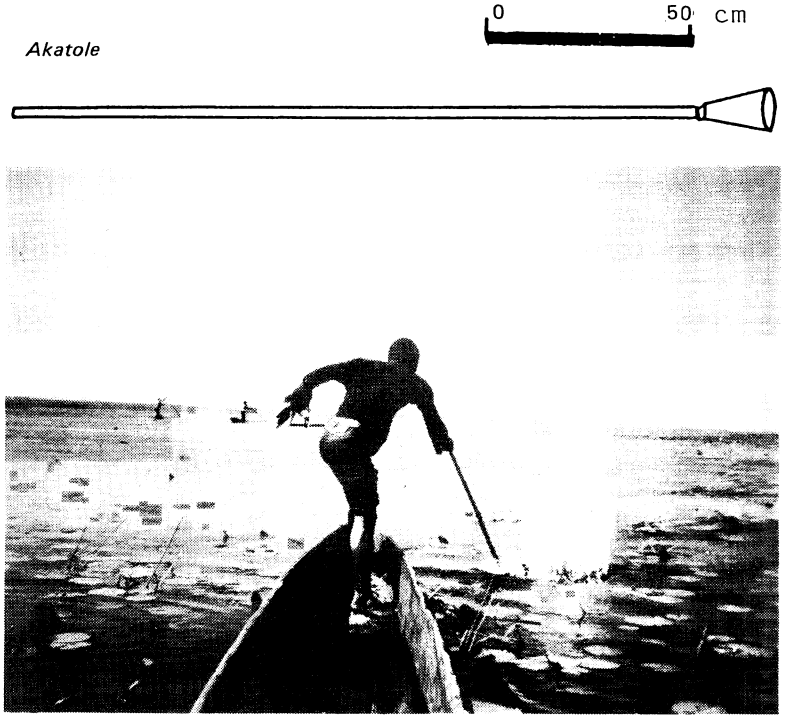

Fig. 10. *Ukusakila* fishing and *akatole* pole.

Tab. 7 indicates the number of fish caught by this fishing method recorded in the study camp. According to this, 3 species of Cichlidae, such as *Tilapia rendalli* (*mpende*), *Tylochromis bangwelensis* (*nsangula*) and *Sarotherodon macrochir* (*nkamba*) occupy more than 90% of the catch. *Tilapia rendelli* reaches more than 50%. These three species are said to be the main objects of catch by *Mukombo* fishing. It may be done at night. Night *Mukombo* is called *Mukombo bushiku*, and many fishermen are fond of night *Mukombo* because that they can fish freely without regard to other fishermen. In *Mukombo bushiku*, they prefer the net with sinkers to *kacaala* net. For they must handle the nets quickly in darkness.

B4. Drifting Net—*Ukukunguluka*—

Table 7. Catch by *Mukombo* fishing (in number).

species	
Mormyrus longirostris	
Mormyrops deliciosus	
Marcusenius monteirii	3
M. macrolepidotus	4
Petrocephalus simus	
P. catostoma	
Hydrocyon vittatus	17
Alestes grandisquamis	2
A. macropthalmus	1
A. imberi	3
Distichodus maculatus	
Barbus banguelensis	
Schilbe mystus	6
Clarias gariepinus	
C. ngamensis	89
C. obscurus	
C. theodorae	
C. buthpogon	1
Synodontis ornatipinnis	
S. nigromaculatus	1
Chrysichthys mabusi	
Auchenoglanis occidentalis	8
Sarotherodon macrochir	3,508
Tilapia rendalli	9,989
T. sparmanii	294
Serranochromis angusticeps	695
S. robustus	55
S. thumbergi	307
Haplochromis mellandi	246
Tylochromis bangwelensis	3,077
Ctenopoma multispinis	
number of *nsanga*	15
fishing days	197

This could not be observed in the study camp. It is commonly used on the Luapula River. It involves setting nets across the river, and allowing them to drift downstream for a short distance with the current. It happens that *Schilbe mystus* (*ulupata*) or *Alestes macrocephalus* (*manse*) are caught abundantly by this method.

3. Activities and Catch

i) *Mukombo*

In this section, the activities of *Mukombo* fishing are described based on direct observation, and the catch by this method is analysed. The fishing ground for this (*icelo*) is close to or around vegetation in shallow water. A desirable *icelo* is the area where *amashinge* reeds (*Eleocharis dulcis*) grow here and there. There the areas of fish nests (*imilindi*) can be seen on the bottom of water. Such areas are also regarded as a desirable *icelo*.

(Fishing Ground Use)

The fishing area around *pamitanda* is divided into several fishing grounds bounded by channels. Each ground is called by a name. *Mukombo* fishermen recognize the name of their daily fishing grounds. Fig. 11 shows the division of the area around the study camp by the fishermen. In the research period, the fishermen of the study camp were engaged in *Mukombo* fishing exclusively in this area. Tab. 8 indicates the daily fishing grounds of the *Mukombo* fishing by the *nsangas* of N'gumbo fishermen recorded from 28 Sep. to 5 Nov. 1983. The water use of *Mukombo* fishing is analysed from Fig. 11 and Tab. 8.

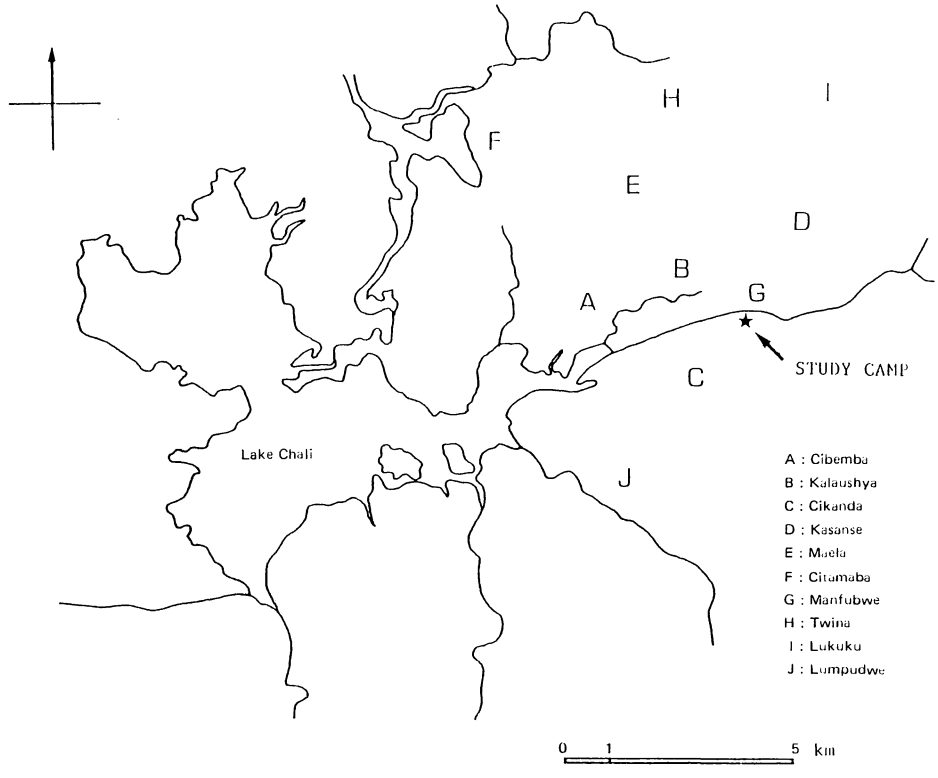

Fig. 11. Geographical division of fishing grounds around the study camp.

Table 8. Daily fishing grounds of *Mukombo* fishermen.

nsanga	Sep. 28	29	30	Oct. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Mwa.-A	A	B	A	D		B	B	B	A	B	B		A	A	B		A	D		A	B	A	A			A	C	B			B	A	
„ -B	B	C	D			B	B		A		A		A	A	B		A			A	B	A	A			A	C	A		B	B	A	
Seba.	D	E		D		G	E				E		B	A	E			D				G	A		A		C				B	A	B
Nel.		E												A	F	A	F	D	B	A	B	A				A	C				B	A	
Benj.	C		B	A		B	A			A	B		A	A	A		A		A	A	B												
Mpu.	B	B	C	A		A	A	A	A	A	B																						
Emma.							B		A	A			A	A	F	F	C	D	A														
Eli.	A		D	D		D	D			A	D		D	A	E																		
Dom.	B		C	A		A	A		A	A	A																						
Cha.														A							A				A		C	A			B	A	
Bena.			B	A		B	A	B	A	B	A			A	B		A																

nsanga	Oct. 31	Nov. 1	2	3	4	5
Mwa.-A	A	B				
„ -B	A	B	A	B	D	B
Seba.		D		B	B	B
Nel.		D	A	B	D	B

grounds	fishing days	
A (*Cibemba*)	76	(47.5 %)
B (*Kalaushya*)	46	(28.8 %)
C (*Cikanda*)	10	
D (*Kasanse*)	18	
E (*Maela*)	5	
F (*Citamaba*)	3	
G (*Manfubwe*)	2	
total	160	

It can be said that fishermen utilized two or three particular grounds entirely. For example, fishermen of *nsanga* Ba only used A and B grounds. *Nsanga* Bj fishermen utilized the same grounds except on 28 Sep. . The frequency of A and B in use of fishing ground is higher than that of the other grounds. The distance to these grounds from the study camp is less than 1 km, so that fishermen can draw near to these grounds in a short time. That is the reason it is selected for the fishing ground. Fishermen of *nsanga* Ne and *nsanga* Se who are familiar with the fishing grounds around the camp, may go to more distant grounds than A or B.

However, fishermen never use the same ground every day. Judging from the results of the previous day's fishing, they decide which ground to go to for fishing today. When they did not get much fish in the previous fishing, they change the ground. In Tab. 8, same sign of fishing grounds(A～J) on the same day does not mean that all of them carried on fishing in a *abamukombo*. It is not necessary for them to use the same *icelo*s simultaniously. Each fishermen can fish separately or in a group as *abamukombo* according to their fishing schedules. They are apt to avoid using the same *icelo* every day, for the amount of catch decreases when they over use it. Accordingly, *Mukombo* fishermen never use the particular grounds intensively, rather they use them partially. As described above, it can be concluded that *Mukombo* fishermen not only minimize the effect of the catch by using the grounds a short distance from their base, but also maximize the amount of catch by using grounds uniformly.

(Daily Cycle)

Abamukombo is not a clear fishing team but a team in which each fisherman is alotted a part of the activity using the *icelo* together. Fishermen of the same group (N'gumbo, Unga etc.) in the same *pamitanda* are apt to form *abamukombo*. Members of the same *nsanga* usually go fishing together, however, not all of them go together everyday. They may go fishing separately. One *abamukombo* is composed of 4 or 5 fishermen usually. The number is not fixed constantly. Each person decides his fishing ground for the day according to a discussion of the men in the *pamitanda*. *Mukombo* fishermen leave *pamitanda* at about 7 o'clock in the morning separately, and join at the *icelo*. Some fishermen who go ahead may make a selection of the first *icelo*, and succeeding men follow them to begin setting net. *Abamukombo* for the day is formed as such.

In the case of *Mukombo* fishing by *abamukombo*, each man is in a line at the intervals of his *kacaala* net and set it. After setting, they move to the other side of *icelo* 50～60m apart from the nets, and wait for the other fishermen. When they are moving, they cannot cross the *icelo*, for they drive out the fishes in it by passing through. People who are sailing into the *icelo*, have to call to the *abamukombo* to make sure of the location of the *icelo*, and take a roundabout way to avoid it. After the fishermen gather at the point, each fisherman advances to his own net, and altogether they fire a volley of thumping the water with *akatole* poles (Fig. 10). When they reach to the nets, each man take out the fish driven into the net and takes off them out of the water. Fig. 12 shows a schema of *ukusakila* fishing process. It is similar to that of the net hunting of the Mbuti pygmy in Zaire reported by Tanno (1976) and other researchers. Thumping the water in *ukusakila* is done by women of the Mbuti pygmy in their net hunting. The owner of the net in *Mukombo* fishing can also keep all of the fish driven into his net (Tanno, 1976). In addition to that, the compulsory distribution of catch is pointed out in the study of hunter-gatherers such as the San and the Mbuti pygmy (Tanaka 1971, Harako 1976, etc.). In contrast to this, each *nsanga* may dispose of his catch of fish individually without exchange of catch. In net hunting of the Mbuti pygmy, it is described that the point of net setting is changed every time the hunters drive the fish because they are to catch equally (Ichikawa, 1976, etc.). They may go to the

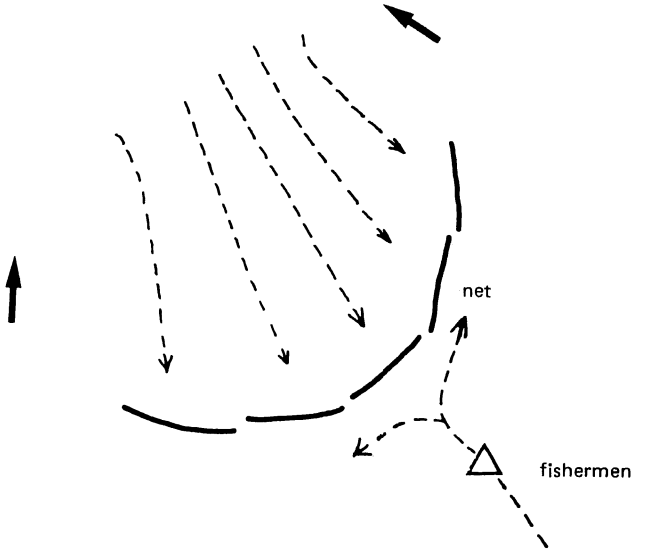

Fig. 12. Schema of *Ukusakila.*

next *icelo* separately after collecting the catch of the previous *ukusakila*. The man who made a big catch must spend more time of collecting fish than the poor catchers. Then he cannot participate in the next *ukusakila* of the *abamukombo*. The amount of catch by each fisherman is likely to be balanced.

Among *abamukombo* fishermen, there is no existence of a leader for fishing who may choose *icelo* or give directions of *ukusakila*. *Abamukombo* fishermen discuss with each other how to perform the fishing giving respect to the experienced man's wishes. A man can leave from the *abamukombo* due to his independent judgement. Some fishermen always go *Mukombo* fishing individually, and the others go fishing in *abamukombo* group. It is just according to the preference of a fisherman. The amount of catch by solitary fisherman and group fishermen are indicated in Tab. 9. Two fishermen given in the table always go fishing individually instead of going as one of the *abamukombo*. We cannot recognize an obvious difference between the catch of the two types of *Mukombo* fisherman. Fisherman insist themselves that the quantity of catch differs personally on according to the skill of each fisherman. Judging from Tab. 9, it cannot be said that people are likely to form *abamukombo* in order to increase the catch.

As described above, activities of reciprocity or egalitarianism such as the exchange or distribution of catch, and changing the site of net cannot be seen among *abamukombo* fishermen. However, it can be pointed out that inequality of catch rarely occurs among *abamukombo* fishermen, as stated above. On the other hand, dotted fishermen in a particular ground may disperse the fish separately, and the efficiency of the catch is supposed to decrease. *Icelo*s in a particular area can be utilized in rotation by *abamukombo* groups.

ii) Fishing Strategy

Swamp fishermen have to perform the fishing with their restricted labour and fishing gears in only several months of a year. Each *nsanga* adopts the characteristic forms of fishing in order to get much catch effectively. In this section, two forms of fishing can be seen. These are as follows:

Table 9. Amount of daily catch by *Mukombo* fishing.

nsanga	total amount	fishing days	total fishermen	day's catch/person
group fishermen				
Mp.	143.9 kg	9	23	6.26 kg
Bj.	241.0	10	23	10.48
Ba.	271.8	10	27	10.07
solitary fisherman				
Ch.	42.4	5	5	8.48
P.K.	183.1	18	18	10.17

(a) multi method fishing
(b) trans method fishing

As for (a) type, it can be mentioned as *nsanga* S which conducts not only *Mkwao* fishing, but also *Ukusebeshya* fishing in parallel. As for (b) type, we can also mention *nsanga* Ka which transfers their fishing from *Ukusebeshya* to *Malalikishya* after the rainy season comes. In the following paragraghs, these fishing strategies are described and analysed.

(a) multi methods fishing

Nsanga S is the only unit which conducts *Mkwao* fishing in the study camp. The *umushila* of it is the Unga man, and its several young *abaswa* are the Kabende people, because they are relatives of the Kabende wife of the *umushila*. They had used *Malalikishya* fishing together with *Mkwao* until the middle of October, after that time, they transferred from *Malalikishya* to *Ukusebeshya*. Tab. 10 indicates the record of *Mkwao* and *Ukusebeshya* fishing conducted by *nsanga* S. An adequate number of men for both methods have to be provided at the same time within an unit, for fishing time of both methods are the same. In *Ukusebeshya* fishing, as there is no need to draw the net like *Mkwao* fishing, the number of men are settled according to the number of nets they use. Usually, a man may carry 6 or 7 nets for *Ukusebeshya* fishing. *Nsanga* S could conduct these two methods at the same time, for there are always 4 or 5 *abaswa* in it. Fishermen who went *icungulo* fishing may be given a rest during the next *kumaca* fishing provided that there is another *umuswa* in place of him.

Tab. 11 indicates the daily catch by *Mkwao* and *Ukusebeshya* fishing. From this table, two facts can be pointed out as follows:

(1) Total catch by *Mkwao* occupies 64.2% of that by these two methods.
(2) In both methods, the amount of catch by *icungulo* fishing occupies 62.9% (*Mkwao*) and 61.1% (*Ukusebeshya*).

These two facts are supported by the frequency of fishing. As shown in Tab. 10, the number of *Mkwao* fishing days are more than that of *Ukusebeshya* fishing, and that of *icungulo* are also more than *kumaca* fishing days. Next, both fishings are compared from the amount of daily catch. As indicated in Tab. 11, the days of poor catch (less than 10kg) can be counted 5 in 45 fishing days by *Ukusebeshya*, on the other hand, 17 in 84 fishing days by *Mkwao*. Rates of the poor catch are 11.1%, 20.2% each, and the number of *Ukusebeshya* nets used in these days were also small (less than 10). In other words, they relaxed their efforts for this fishing. It may be stated that the fishermen can expect more a stable catch by *Ukusebeshya* fishing than by *Mkwao*. *Nsanga* S depends on the catch for commercial fishing on that by *Mkwao* quantitatively. Even in the case of a poor catch by *Mkwao*, they can make up for it by *Ukusebeshya* fishing. At this point, it is significant for fishermen to adopt *Ukusebeshya* fishing together with *Mkwao* fishing.

Finally, a pattern of net setting in *Ukusebeshya* of *nsanga* S is analysed. As shwn in Tab. 12, *nsanga* S set their nets at two spots separately from the middle of November, 1983. In this case, they do not go *kumaca* fishing usually, because all the nets were used in *icungulo* fishing. Due to the separate setting of nets, they can make up for the fluctuation of a catch in a single spot. Thus, both fishings (*icungulo* and *kumaca*) were done in only 3 nights as indicated in Tab. 10. It is supposed that they adopted this form of setting net in order to ensure the labour input for *Mkwao kumaca* fishing.

It may be concluded that *nsanga* S adopts *Ukusebeshya* fishing by which they can get stable catch, with the base of that by more productive *Mkwao* fishing. They also arrange the labour input properly to conduct the two kinds of fishing at the same time.

(b) trans method fishing

Almost all *nsangas* which stay in *pamitanda* from Novemver to December transfer their

Table 10. Daily records of going fishing (*Mkwao* and *Ukusebeshya* fishing) by *nsanga* S.

date	M.I.	M.K.	U.I.	U.K.		M.I.	M.K.	U.I.	U.K.
Oct. 17	+	-	-	-	Nov. 16	+	-	+	-
18	+	+	-	-	17	+	-	+	-
19	+	+	-	-	18	+	-	-	-
20	+	+	-	-	19	-	-	+	-
21	+	-	-	+	20	+	+	+	-
22	+	-	-	+	21	+	-	+	+
23	+	-	-	+	22	+	-	+	+
24	+	-	-	+	23	+	-	+	-
25	+	-	-	+	24	+	+	+	-
26	+	-	-	+	25	+	+	+	-
27	+	-	-	+	26	+	-	+	-
28	+	-	-	-	27	+	+	+	-
29	+	+	-	+	28	+	+	+	-
30	+	+	-	+	29	+	-	+	-
31	+	+	+	+	30	+	+	+	-
Nov. 1	+	+	+	-	Dec. 1	+	+	+	-
2	+	+	-	-	2	+	-	+	-
3	+	+	+	-	3	+	+	+	-
4	+	+	-	-	4	+	+	+	-
5	+	+	+	-	5	+	+	-	-
6	+	+	-	+	6	+	-	-	-
7	+	+	-	-	7	+	+	-	-
8	+	+	+	-	8	+	+	-	-
9	+	+	-	-	M.I. : *Mkwao icungulo*				
10	+	-	+	+	M.K.: *Mkwao kumaca*				
11	+	+	+	+	U.I. : *Ukusebeshya icungulo*				
12	+	+	+	+	U.K.: *Ukusebesha kumaca*				
13	+	+	+	-	+ : went fishing, - : stayed in the camp				
14	+	+	+	-					
15	+	+	+	-					

Table 11. Amount of catch by *Mkwao* and *Ukusebeshya* fishing of *nsanga* S.

(kg)

Date	M.I.	M.K.	U.I.	U.K.	total		M.I.	M.K.	U.I.	U.K.	total
Oct. 17	11.6	-	-	-	11.6	Nov. 16	2.7	-	23.4	-	26.1
18	47.3	37.1	-	-	84.4	17	3.2	-	17.8	-	21.0
19	42.4	11.7	-	-	54.1	18	13.8	-	-	-	13.8
20	17.5	28.9	-	-	46.4	19	-	-	16.9	-	16.9
21	20.1	-	-	38.9	59.0	20	3.9	4.6	11.6	-	20.1
22	30.7	-	-	26.3	57.0	21	10.4	-	13.1	6.6	30.1
23	60.2	-	-	27.6	87.8	22	6.6	-	16.3	13.2	36.1
24	44.7	-	-	33.1	77.8	23	11.6	-	32.2	-	43.8
25	39.6	-	-	40.3	79.9	24	27.6	25.7	24.9	-	78.2
26	41.9	-	-	27.4	69.3	25	5.4	13.2	26.7	-	45.3
27	11.4	-	-	21.9	33.3	26	8.9	-	7.6	-	16.5
28	43.5	-	-	-	43.5	27	29.1	9.9	18.1	-	57.1
29	18.7	48.2	-	60.9	127.8	28	19.6	14.0	30.0	-	53.6
30	36.8	24.3	-	21.8	82.9	29	7.5	-	17.3	-	24.8
31	37.7	67.8	12.1	28.4	146.0	30	13.3	11.6	10.8	-	35.7
Nov. 1	24.8	19.7	45.1	-	89.6	Dec. 1	7.1	7.0	21.6	-	35.7
2	9.6	23.2	-	-	32.8	2	28.3	13.6	24.7	-	66.6
3	28.7	10.3	66.0	-	105.0	3	35.5	31.4	22.9	-	89.8
4	51.4	13.1	-	-	64.5	4	42.6	18.7	14.1	-	75.4
5	16.8	7.8	22.8	-	47.4	5	29.8	5.7	-	-	35.5
6	15.5	21.9	-	30.8	68.2	6	20.5	-	-	-	20.5
7	34.7	47.3	-	-	82.0	7	10.4	18.1	-	-	28.5
8	19.3	13.0	22.7	-	55.0	8	18.8	11.6	-	-	30.4
9	20.5	42.3	-	-	62.8						
10	13.5	-	12.1	8.2	33.8	total	1,164.9	686.4	631.4	401.6	2,884.3
11	25.7	15.8	8.6	11.6	61.7	(*Mkwao*)			1,851.3		
12	9.5	15.2	15.3	4.6	44.6	(*Ukusebeshya*)			1,033.0		
13	17.2	5.2	22.2	-	44.6						
14	14.4	30.0	21.8	-	66.2						
15	2.6	18.5	32.7	-	53.8						

fishing method from *Ukusebeshya* to *Malalikishya*. 8 *nsangas* in 10 transferred their method like this in the study camp. Fishermen themselves hope to continue *Ukusebeshya* fishing, for *Mormyridae* fish become to be active and easy to be caught in the early period of the rainy season. However, it is impossible to watch and wait in the rain for several hours. It was observed that several fishermen who could not continue to stay grounds in the rain and came back to the camp, left their nets there. In these cases, it can be said that *Ukusebeshya* fishing is transferred into *Malalikishya* without intention. This trans method from *Ukusebeshya* to *Malalikishya* occurs as a result of the weather.

Tab. 13 shows the amount of catch of *nsanga* Ka by *Ukusebeshya* from the middle of November to early December, and by *Malalikishya* in early January. According to the table, weight of Mormyridae fish occupies less than 50% of the total catch by *Ukusebeshya*

Table 12. Number of nets used in *Ukusebeshya* fishing of *nsanga* S.

date	*icungulo*	*kumaca*
Oct. 17	–	–
18	–	–
19	–	–
20	–	–
21	–	10
22	–	10
23	–	10
24	–	10
25	–	10
26	–	11
27	–	11
28	–	–
29	–	10
30	–	10
31	5	6
Nov. 1	11	–
2	–	–
3	10	–
4	–	–
5	10	–
6	–	12
7	–	–
8	9	–
9	–	–
10	8	4
11	7	5
12	7	4
13	12	–
14	11	–
15	11	–
16	11	–
17	6 + 6	–
18	–	–
19	11	–
20	3 + 7	–
21	11	8
22	6	7
23	6 + 7	–
24	6 + 6	–
25	12	–
26	6	–
27	12	–
28	6 + 7	–
29	11	–
30	6 + 6	–
Dec. 1	6 + 7	–
2	6 + 7	–
3	6	–
4	12	–
5	–	–
6	–	–
7	–	–
8	–	–

6 + 6 : 2 spots (6 nets each)

Table 13. Amount of daily catch by *nsanga* Ka.

date	U.I.	U.K.	*Malalikishya*
Nov. 10	23.6 (0)	20.2 (18.0)	
11	9.4 (5.1)	16.8 (13.0)	
12	22.2 (8.7)	2.7 (0.3)	
13	9.2 (7.2)	11.4 (10.5)	
14	17.0 (10.0)	15.4 (9.7)	
15	20.4 (5.9)	15.2 (12.4)	
16	–	–	
17	7.7 (6.8)	8.1 (5.4)	
18	4.8 (3.3)	–	
19	6.8 (5.4)	–	
20	7.0 (6.2)	16.0 (14.1)	
21	12.6 (8.4)	9.5 (8.2)	
22	16.8 (4.7)	–	
23	21.6 (11.3)	–	
24	6.6 (5.8)	8.3 (6.3)	
25	10.3 (7.2)	13.8 (11.6)	
26	14.6 (3.9)	10.5 (9.7)	
27	11.4 (7.1)	24.7 (22.4)	
28	10.8 (5.9)	13.2 (11.1)	
29	17.7 (9.1)	11.4 (10.1)	
30	14.7 (9.6)	–	
Dec. 1	12.9 (8.1)	11.9 (9.7)	
2	21.0 (13.0)	–	
3	20.6 (4.8)	16.1 (14.1)	
4	16.6 (8.3)	17.4 (15.7)	
5	10.9 (3.9)	11.8 (9.5)	
6	11.9 (8.0)	8.3 (6.6)	
7	11.4 (7.3)	12.7 (9.4)	
8			
30			20.4 (8.4)
31			29.3 (15.8)
Jan. 1			36.2 (27.6)
2			19.2 (11.6)
3			16.6 (5.8)
4			26.7 (11.8)
5			11.3 (4.8)
6			15.5 (3.7)
7			18.0 (9.2)
8			13.3 (6.7)
total	370.5 (185.0)	275.4 (227.8)	206.5 (105.4)

( ) : *Mormyridae* fish
mesh size of the net : 1.5 inches
number of the net : 7.

icungulo fishing, but in *kumaca* fishing it occupies more than 80%. It corresponds to the catch by the other *nsanga* in the study camp on the whole. On the other side, Mormyridae fish occupy 56% of the total catch by *Malalikishya*, it is very much the same as that by *ukusebeshya icungulo*. As indicated above, it is concluded that fishermen are not able to continue *Ukusebeshya* fishing which intends to catch Mormyridae fish owing to the change of weather in the middle December, however they can meet the situation without waiting there for several hours. The shorter working hours of *Malalikishya* fishing are likely to make the transference easier to occur.

4. Processing

Fishermen in *pamitanda* sell their catch after the process of smoking. Each *nsanga* keeps the smoked fish on a rack for stock in its *umutanda*, and sell them to the traders who go round from *pamitanda* to *pamitanda*. Most of the fish caught in the Bangweulu Swamp are disposed to the city markets in Copperbelt (Fishery Statistics, 1971). There are some fishermen who transport their fish themselves to the peripheral villages around the swamps or the markets in the cities of Copperbelt to sell them. In this section, procedure of smoking fish which is the essential process to sell them, and the fishermen's fish use is also analysed. The procedure is divided into three stages as follows: (1) gutting, (2) smoking, (3) selling.

(1) gutting

As soon as fishermen come back to the camp with the daily catch of fish, they scale and gut them at once. Skin colour of caught fish vanishes within several hours under a burning sun. Fishermen call the phenomenon *ukubola* (to rot), and dislike it because the meat of the fish becomes deteriorated. In the stationary gill net methods such as *Ukusebeshya* or *Malalikishya*, people have to take out the fish from the nets (*ukukula isabi*) loading them on their canoes before scaling. One or two persons sit on both ends of canoe and they take up the nets while taking out the fish on their knees. Women are not in this work usually. When all of the fish caught are taken out from the net, the folded net is washed in the water and dried on the poles. The work takes 30～40 minutes per net. Fishes are scaled soon after being taken out, and these are put on the drying rack. This work is carried out by wife and childen of the *umushila* who are staying in *pamitanda*. Wife and children of *Mukombo* fishermen also scale and gut the catch with the *umushila* just after he comes back to *pamitanda*.

Usually, each *nsanga* perform their fishing independently, however, people may work together with the people of different *nsanga*. In the study camp, the wives of N'gumbo fishermen participated in scaling and gutting the catch of the Kabende fishermen. Two fishermen had to take out fish from their nets in the early morning when they came back from *Ukusebeshya kumaca* fishing. They begged the N'gumbo women to take out the fish because they were afraid that their catch would become to be rotten. The women met the request, for they had time in the morning. They helped to scale and gut the catch regularly for several mornings. Each woman was payed 2～3kg of Mormyridae fish for her service of the day. Fishermen are fond of Mormyridae fish for both self consumption and selling because its meat is fatty. However, it is hard to catch them by *Mukombo* fishing. In this case, the fish catch is shifted from *nsanga* to *nsanga* within a *pamitanda*. Another shifting could be seen in the study camp. Some of the Mormyidae fish (especially Genus *Marcusenius* and *Petrocephalus*) caught by *Ukusebeshya* fishing of the Unga fishermen were given to N'gumbo fishermen for the baits of *Mwando* fishing, and the catch by *Mwando*, *Clarias* fish, were sold at a low price in the opposite direction. Clarias fish are a favorite food of the Unga fishermen, but they cannot afford to use *Mwando* fishing together with the

night fising. It may be said that the catch by both groups in the camp are exchanged as such. Fatty internal organs of *mintesa* fish are heated to produce pure fat and preserved for cooking oil (*mafuta mintesa*). Fishes are dried in the sun on the stand for drying (*cintamba*) after gutting. Scaled fish are taken into the *umutanda* within 10 minutes to be smoked. Fishermen happen to go to the local markets of the villages with the sun dried fishes to sell them. Sun dried fish is called *umusama*.

(2) smoking

There is a smoking rack (*ultabo*) in *umutanda*. It is the fire place for smoking fish (Fig. 13). Tab. 14 indicates the preferable plant species of fire woods for smoking by fishermen. *Umushila* of *nsanga* has to prepare these fire woods for smoking at the village markets on the mainland. Brelsford (ibid.) states that fires are fed with stalks of cassava, the parings of the cassava root, damp reeds and papyrus with no reference to the selection of fire woods.

In the system of smoking, fires are lit underneath *ultabo* at first. People feed the fire with the woods so as to form smoke and not flame. Sometimes, the fish on the rack are covered with a cloth or layer of grass that hold the smoke. It takes about 2 hours for smoking one side of a fish. The other side is also smoked in a shorter time. Fishes are dried and given a brownish lustre by smoking. This is said to be enough for fish of small size such as *mintesa* (*Marcusenius macrolepidotus*), or *cipumamabwe* (*Petrocephalus catostoma*) fish. On

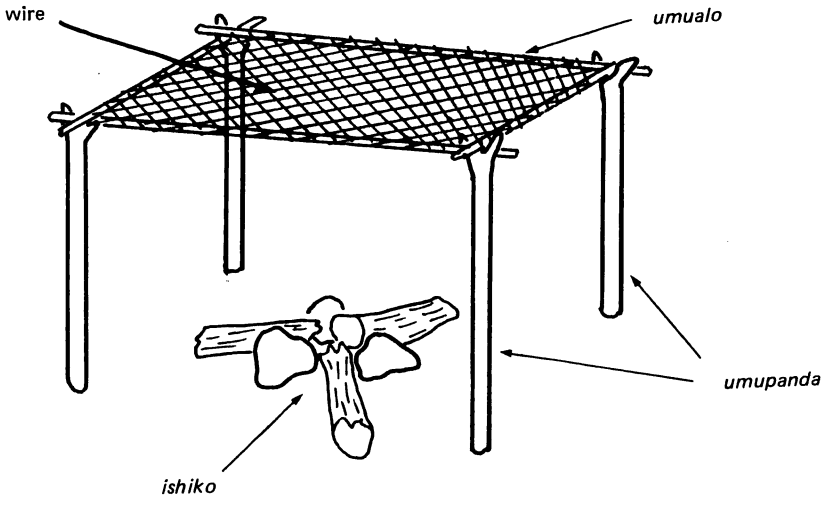

Fig. 13. *Ultabo* – smoking rack – .

Table 14. Fire wood plants for smoking fish.

scientific name	vernacular name
Syzygium spp.	*umufinsa*
Combretum mechowianum	*umufuka*
Parinari curatellifolia	*umupundu*
Combretum celastoidea	*umutala*
Albizia adianthifolia	*umubanse*

the other hand, 2 or 3 hours smoking is not enough for smoking of Cichlidae fish (*Tilapia rendalli* or *Sarotherodon macrochir*). Semi-dried fish are not good for selling, because they are in danger of getting spoiled. However, people relish them due to their imperfection of drying. Fishes which are smoked on *ultabo* are dried again in the sun to dry completely, and are put on the rack (*umukungu*). Smoked fish can be kept on *mukungu* for 2 or 3 months.

The amount of daily catch of *nsanga*s was recorded before and after smoking for several days (Tab. 15). It is caught by *Mkwao* and *Ukusebeshya* fishing of the *nsanga*. From Tab. 15, we can see the amount of their daily consumption by the *nsanga* and the way of utilization according to the fish species. In *nsanga* S, 58.6% of the fish catch were smoked, and the rest remained unsmoked. Which means nearly half of them were consumed by the members themselves. The *nsanga* is always composed of 4 or 5 *abaswa* other than *umushila* S, as described. Therefore, it can be said that 122.56 fishes were consumed per person everyday. Moreover, 75.7% of Mormyridae fish were set aside for selling, however, only 12.6% of the other kinds of fish were left for selling. That is to say that they themselves avoid consuming Mormyridae fish. It does not mean that they dislike eating the fish of this kind. On the contrary, it has a high market value, because people in the cities are more fond of Mormyridae than the other fish. They are apt to leave Mormyridae fish for selling owing to its market value, and consume the other fish species for their self-consumption.

(3) selling

Traders from Copperbelt cities (Ndola, Mufulira, Kitwe etc.) visit to buy fish of Bangweulu passing through Zaire by land. Other traders from Kabwe or Lusaka come to Mukuku Village, at the south-western end of the swamps.

Tab. 16 indicates the recorded number of traders and weight of smoked fish which passed through Katanshya check post. The fish catch by the fishermen in the study camp were sold exclusively to the copperbelt cities. There are some traders who purchase the fish which are sent by fishermen to the local markets or villages such as Cinsanka, Samfya, but most of them go round *pamitanda*s themselves to buy it there personally. Traders who go round *pamitanda*s are divided into two groups, one of which is the local people around the swamps, and the other is the traders from Copperbelt. The former are Unga traders who

Table 15. Consumption of daily catch.

date		*Mormyridae* fish	others	
Nov. 12]	B	: 1,126	72	
13]	A	: 1,076	41	
13]	B	: 968	295	
14]	A	: 779	92	
15]	B	: 1,110	581	
16]	A	: 652	29	
16]	B	: 935	465	
17]				
18]	A	: 527	34	
28]	B	: 1,260	592	
29]	A	: 1,054	56	
total	B	: 5,399	2,005	
	A	: 4,088	252	(in number)

B : before smoking, A : after smoking.

Table 16. Monthly production of dry fish in Bangweulu Fishery.

(kg)

Bangweulu total												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1973	57802	40277	50434	39733	56708	163075	162311	148478	152610	175979	160041	114081
1974	56308	37026	34731	30878	58741	72380	138091	114145	183612	203495	180876	188874
1975	81362	33853	25327	26067	39191	54741	329644	125198	123571	158888	135619	–
passed through Katanshya check post												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1973	35241	28391	37281	33585	48093	154165	136603	130565	128065	148176	126813	94481
1974	43904	30585	30978	26701	53449	65612	132747	105732	169104	176261	154331	165621
1975	72066	27903	20787	20332	34836	50780	324469	120313	110087	135121	108949	–
1976	–	–	–	–	–	–	–	–	111139	–	135572	121963
1977	56750	32998	25577	41745	43436	115350	128753	128702	169603	151377	132895	122717
1978	36579	20980	10161	16871	49336	54604	83407	88291	115858	133837	135470	108464
1979	46689	17844	19325	2051	51378	63177	97189	163329	116923	175700	265206	108914
1980	51979	32765	32177	26147	63302	72451	89661	108519	138497	178595	157826	58852
1981	71087	31214	29076	33019	30671	69956	112924	148315	167621	211769	173233	165937
1982	102673	70470	44976	45298	47132	87447	139246	139608	232540	137832	179168	82065
1983	47949	29653	22058	29676	48863	90903	121254	121749	136317	144438	151785	232688

(recorded by Dept. of Fisheries, Samfya.)

come from the Villages on the lake shore or river bank, such as Twingi, Cinsanka. Around the Chilubi island, at the south-eastern corner of the lake, there are a lot of Bisa traders who are the inhabitants of the island. They go round *pamitanda*s in the swamps carrying some vital commodities and foods in their canoes to barter for fish. There are some traders who spent more than a month in rounding *pamitanda*s. They lay in a stock of smoked fish to sell them to the market traders from the cities in Copperbelt or Mansa. Local traders are not organized, and the exchange rate of fish and items are not fixed by the authorities, though they are bartering by similar exchange rate. Tab. 17 shows the exchange rate of two traders recorded in the study camp. Cichlidae smoked fish are called *mpende* (*Tilapia rendalli*), and Mormyridae fish are called *mintesa* (*Marcusenius macrolepidotus*) generally. Traders always value one *mpende* at two *mintesa*. Copperbelt traders do not carry the barter trade, but always trade by cash. In a relay village, such as Cinsanka, they employ one or two paddlers and get a rental boat to go round *pamitanda*s. People who are to be paddlers communicate with each trader individually at the relay village and work together for borrowing boat and balances to weigh fish and providing foods and materials of baskets. In the relay villages, the men who are to be paddlers watch and wait traders instead of fishing in *pamitanda*. When traders come into *pamitanda* to buy fish, fishermen who want to sell their fish pack them in the baskets with the paddlers. The trader weighs the fish and pays cash for them.

Although smoked fish are dealt with in cash by weight regardless of the fish species, demand of fish in markets is different from species to species. As stated above, the unit cost of *mpende* fish and *nkamba* fish are valued more highly than *mintesa* fish because of its size, however, there are some traders who refuse to purchase them for fear they will spoil by dampness. Although more *matuku* fish are caught more than Mormyridae fish by stationary gill net fishing, people are not fond of eating this fish due to its bone. Therefore, traders are apt to refuse to purchase them. Fishermen also make light of it, and dry them only in the sun without smoking. One informant explained that fishermen do not waste fire woods on smoking *matuku* fish, for it is useless smoking. However, in the rainy season, January and February, it is smoked and sold at a good price. Because it is impossible to dry in the sun due to the rain, and the catch of the other fishes decrease extremely in this

Table 17. Exchange rate of smoked fish.

items	trader A		trader B	
	mpende	*mintesa*	*mpende*	*mintesa*
biscuit (1 pack)	5	15		12
" (large pack)	21	27		
salt (800 g)		100		
" (100 g)				20
match box	5	10		8
tobacco		25		20
razor	5	10		
snuff (1 spoon)	10	20		
bread (2 pieces)	10	20		
fish-hook	5	10		
candy		1		1
sugar (100 g)				35

season.

According to Tab. 16, the quantity of catch passed through Katanshya check post is less in March and May, the later period of the rainy season, and the most in September to November, that of the dry season. If the amount of catch is regarded as the degree of fishing activity, it can be said that the best time for fishing in the Bangweulu Swamps is the period from September to November. As shown in Fig. 4, the water level of the Lake Bangweulu becomes lower in this season, when that of the swamps also becomes lower, so that it is easy for fishermen to fish in the swamps. In addition to this, this season is a turning point of the fishing in the swamps from *Mukombo* to *Ukusebeshya* fishing.

DISCUSSION

In this chapter, the significance of fishing of the swamp fishermen for their whole life is discussed, and the form of utilization of swamp environment for several group is examined from the point of fishing method, season and daily activity of fishing.

As described before, there are no full-time fishermen who fish all year round in the swamp area, but they can go to the swamps to fish when they are not occupied with their agriculture, which includes cultivation of cassava, maize, pumpkin and groundnuts (Fig. 5). The existence of the Batwa group, fishing specialists in the swamps, is believed among the fishermen despite the fact that the group has not yet been confirmed. It is assumed that the Batwa group is the disdained people who live in the swamp islands or around the swamps, and carry on agriculture on a small scale, the system of which is different from that of the mainland people.

Through the anthropological research of agriculturists in Sudan savanna and Zaire tropical rain forests, Takeda (1983) and Sato (1983) insist that hunting or fishing of the people can be regarded as one of their major activities for supplying protein foods. As the agriculturists are engaged mainly in agricultural activities, they are restricted to part-time hunting within a small area around their settlements and fields. However, the fishermen of the Bangweulu swamps have to approach the swamp area far from their villages. They set

up the fishing camp (*pamitanda*) for fishing, and settle there for several months. The main villages of the Unga or Kabende fishermen are 30 to 40 km away from the fishing camp, and that of the N'gumbo is 90 to 100 km. To be exact, they are seasonal emigrants. One of the factors of it is that the Bangweulu fishery is involved in the marketing circulation which includes the Copperbelt cities at present. Swamp fishing is an effective means of getting cash for the fishermen. Accordingly, the swamp fishermen are not only supplied with protein food, but also get cash from their fishing. As described in the former chapter, selling fish for cash to the Copperbelt markets has fast become popular among the people around the swamps. Besides, they may work in the mines of the Copperbelt Province for cash. Around Lake Bangweulu, we can see many people who have had the experience of working in a mine. Nevertheless, swamp fishing, which depends on the fish market, is carried out as an economic activity more than for subsistence. Brelsford (ibid.) asserts that the facility of earning good money without leaving home or breaking up family and clan unity is an important factor for the Unga in the choice of fishing as the favorite form of economic activity. His assertion can be thought to apply to the other groups such as the N'gumbo.

Their fishing camp (*pamitanda*) in the swamps is composed of the persons who are related to each other living in the same or neighbouring villages. They maintain their kinship also in their fishing camps. Their kinship relation is extended to the membership of their production unit, *nsanga* in *pamitanda*. *Nsanga* is the unit of selling fish as well as that of fishing activity, in which fishermen are able to maintain their daily relations in villages. It can be said to be a form of adaptation to the seasonal emigration of the fishermen for commercial fishing.

Although the swamp fishermen can get a great amount of cash income, there is no fishing specialist in the swamps. Several reasons for this can be pointed out as follows. As described above, they are cassava (or maize) cultivators fundamentally, and their village is the stable base of life. They can continue to live through their kinship relations which have a significance even in the fishing camp (*pamitanda*) and production unit (*nsanga*). On the other hand, the swamp area, especially around *pamitanda*, is an unsuitable place to live in. There is not enough habitable area, so there is a lot of *pamitanda* on floationg islands. People can only inhabit the floating islands during the dry season, when the water level is low. Therefore, they cannot find a suitable place to settle in the swamps. A tract of ground around the swamps has alreday been used as the territory of several groups. Moreover, an enormous number of mosquitoes inhabit the swamps. People are threatened with serious diseaese like malaria by mosquitoes. It is a menace to the health of the people. It makes it impossible for the fishermen to stay and fish in the swamps throughout the year. It should be emphasized that fishermen cannot expect to gain a regular catch on account of the seasonal movements of fish, which also make it difficult for the fishermen to stay there. Mormyridae fish concentrate on the swamps in the early and later period of the dry season (April to May, October to November) and are easy to be taken, but the catch decreases in other periods. Cichlidae fishes begin to move from the swamps to the open lakes, when the rainy season comes. From these points, we can see that the fishermen cannot help but do their fishing seasonally based in their main villages out of the swamp.

Swamp fishermen embrace several groups, they have to co-exist with each other to do their fishing. As described above, forms of swamp fishing in points of method, season and time-table are different from group to group. In the study camp, the mainland fishermen, N'gumbo, mainly use *Mukombo* method. On the other hand, Unga fishermen usually prefer the stationary gill net method such as *Ukusebeshya*, *Malalikishya* to the other methods. In the previous chapter, it is pointed out that the types of fish caught varies clearly from method

to method. Generally speaking, Cichlidae fish are caught by *Mukombo* fishing, and Mormyridae fish are caught by *Ukusebeshya* fishing. Fishermen themselves choose a particular type of fish to sell, and by this, their fishing method is inevitably decided. The main fish species caught by these two methods are different, so that the fishermen of the different groups are not pitted against each other concerning fish species to catch. As the periods of staying in *pamitanda* of these groups do not overlap each other owing to the different fishing seasons, the duplication of fishermen is avoided as a result. Accordingly, the amount of catch by both methods are maintained quantitatively. When the fishermen of different groups overlap each other in *pamitanda* in October and November, conflict of fishing among the fishermen does not occur because of their different fishing hours. As described in the former chapters, *Mukombo* fishing is carried on in the daytime. Conversely, *Ukusebeshya* fishing is carried on at night to catch the nocturnal fish. With regard to *Mkwao* fishing, fishing hours of *Mkwao* fishermen is different from that of *Mukombo* fishermen. Their fishing ground is also different from that of *Ukusebeshya* fishermen. It can be said in summary that no clash occurs among the fishermen, concerning fishing methods, grounds, season and fishing hours. Their swamp use can be interpreted as a segregating influence among the swamp fishermen.

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